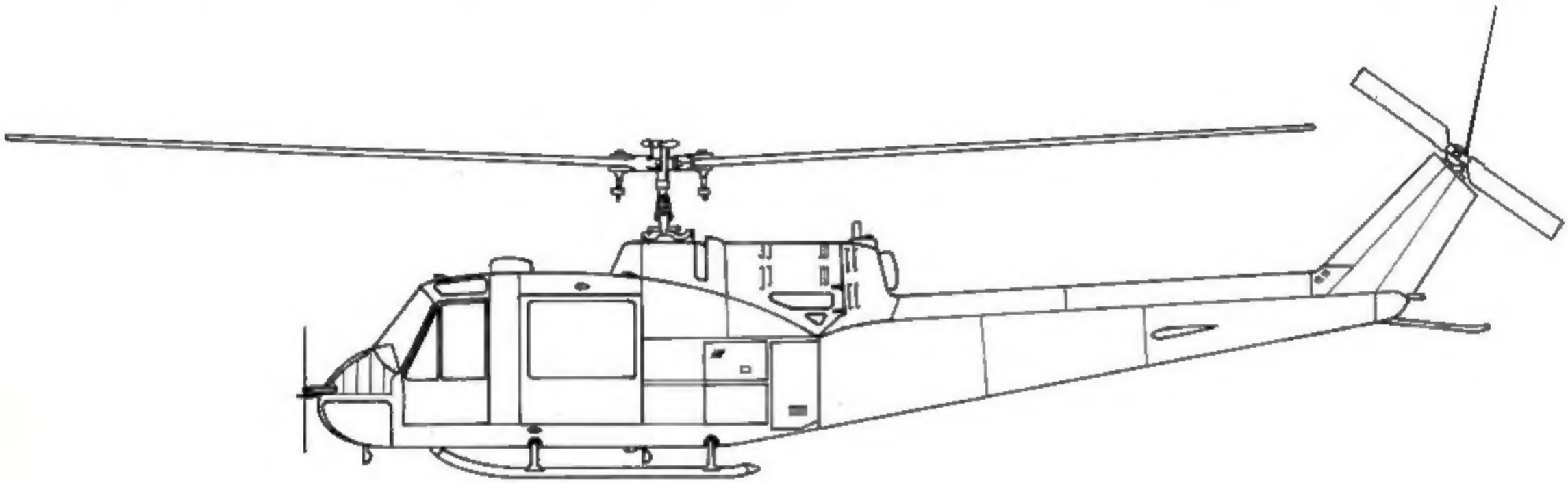
UH-1 HUEY in action

squadron/signal publications
Aircraft Number 75

UH-1 HUEY in action



By Wayne Mutza
Color by Don Greer
Illustrated by Perry Manley

squadron/signal publications

UH-1B of the 'Crocodiles' Gun Platoon, 119th Aviation Company, based at Camp Holloway, Pleiku in July of 1965.

ISBN 0-89747-179-2

If you have any photographs of the aircraft, armor, soldiers or ships of any nation, particularly wartime snapshots, why not share them with us and help make Squadron/Signal's books all the more interesting and complete in the future. Any photograph sent to us will be copied and the original returned. The donor will be fully credited for any photos used. Please send them to: Squadron/Signal Publications, Inc., 1115 Crowley Dr., Carrollton, TX 75011-5010.

DEDICATION

This book is dedicated to the warriors who rode the Huey into combat, many of whom, by the performance of their deeds, did not return from 'the helicopter war'. I'm especially indebted to my family who endured through this project and to the following, most of them past and present Huey crewmembers, who gave freely of their time and material — without their valuable assistance this book would not have been possible.

Dave Delisio
Dave Evans
Larry Ford
Tom Garcia
Dave Grieger
Tom Hansen
Pete Harlem
Terry Love
Gregg Matteson
Lex McCaulay
Bob Mills
Cary Shelton
Bob Steinbrunn
Boyd Waechter
Ron Zacek
US Army
US Air Force
US Navy
US Marine Corps
Bell Helicopter
Los Angeles County Fire Deptment

PHOTO CREDITS

I would also like to extend special thanks to the following who supplied photos and information:

Jim Banicki
Mike Campbell
Bob Chenoweth
Bob Cooney
Bill Hardy
Duane Heda
Tom Hehn
CWO Koening
Joe Long
Elof Lundh
George Frisbee
Mike Meadows
NASA - Wallops Island
Mike Stratton
Norm Taylor
Geneva Warren
Gary Wetzel
US Army Military History Institute
Smithsonian Institution
Petroleum Helicopters, Inc
Manfred Faber
Terry Love

Flight of UH-1Ds from 116th Aviation Company refuel at POL while Ds from 335th Aviation Company overfly them. (Bell)

INTRODUCTION

The UH-1 Huey has more than earned its place in the annals of aviation history, its distinctive 'tadpole' silhouette having become the very symbol of the Vietnam war, which forged both the Huey's diversity and durability. It continues to thrive in both civil and military agencies around the world. But while use of the Huey quickly became widespread, the US Army initially was responsible for the aircraft's inception and nurtured it through its developmental stages.

Army rotary wing aviation had its beginnings during the Korean War when the helicopter was used for transportation and medical evacuation. By the mid-1950s the helicopter had became an essential factor in combat operations and in 1954 the Army began to seriously explore the possibilities of using helicopters as flying gun platforms — the stage was set. However, contemporary technical limitations in helicopter development hampered the effectiveness of the helicopter's versatility until the late 1950s.

As early as 1952 the Army's equipment development guidelines called for a state of the art helicopter for medical evacuation, instrument training, and general utility missions. Existing helicopters were either too large or performed inadequately. The Army used the phrase *military characteristics* to describe requirements for the machine's size, weight, speed, load carrying capability, maneuverability, and other traits before the aircraft was on the drawing board. The utility helicopter characteristics of 1953 would be revised in 1959 as a result of initial studies and the Army's experiences with its own and French helicopters....but by this time the Huey had already been born.

The basic requirements for a new utility helicopter put forth by the Army called for the ability to carry an 800 pound payload with a mission radius of 100 nautical miles at a constant speed of 100 knots. The aircraft also had to be able to hover out of *Ground effect* at 6,000 feet in temperatures of 95°. Additionally, it had to be transportable in cargo aircraft and possess characteristics lending itself to ease of maintenance in the field. Bell Helicopter's design filled this big order admirably and was selected from some twenty entries submitted in the Army's design competition held in January of 1955 to select the new Army utility helicopter.

XH-40

Bell was awarded a contract to build and test three prototypes under the designation XH-40 in June of 1955. Bell worked quickly and on 22 October 1956 the first XH-40 flight was accomplished in aircraft 55-4459. The XH-40 was 42 feet 8 inches long and was powered by a Lycoming XT-53-L-1 turbine engine rated at 700 shaft horsepower (shp). Prominent features of the first prototype included a bulbous rotor head fairing with an arch shaped intake and cyclic controlled elevators at the base of the tail fin. The first prototype now rests at the Army aviation museum at Ft Rucker, Alabama.

Bell's success at winning the Army contract was due in large part to the introduction of the turbine engine, the inception of which is attributed to Bell's pioneering efforts which began in 1954 with the flight of the first turbine-powered helicopter. Colonel John Oswalt, the senior Army aviation officer in the Research and Development section during the late 1940s and early 1950s, was instrumental in putting the first turbine engines in Army aircraft and also initiated the *military characteristics* for the Huey. Gas turbine engines are better than piston types in helicopters because they are lighter, provide more power, and utilize simpler drive systems. A turbine engine can be mounted horizontally allowing more cabin space versus the piston engine which usually occupied valuable fuselage space.

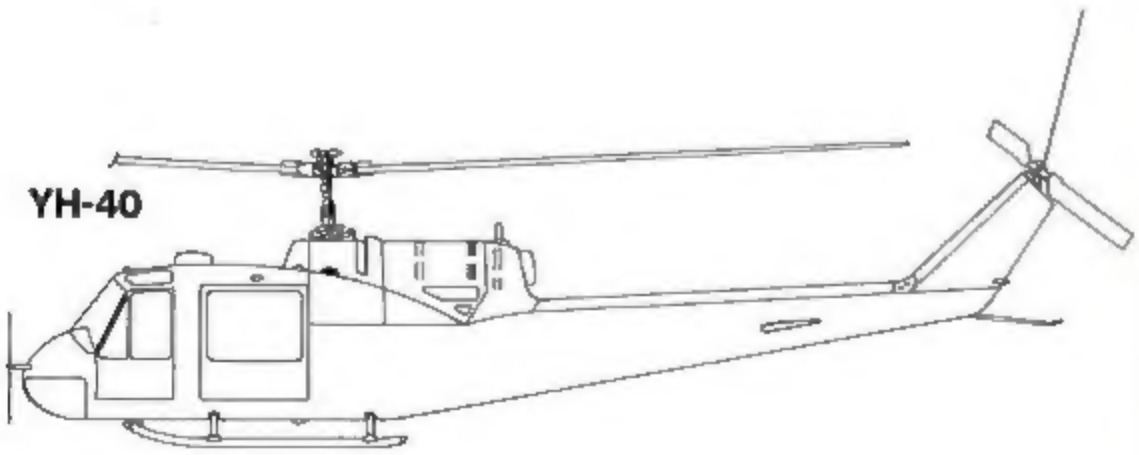
The low profile fuselage design incorporated a unique combination of features ensuring a smaller target, fast easy cargo and troop loading, and easy maintenance; the cargo floor level was only two feet above ground. In designing the airframe, Bell designers considered visibility for all aboard, as evidenced by the placement of the large windshield, cabin windows, and 'chin bubbles'. Much to the maintenance crew's delight was the use of quick opening cowlings and access panels as well as quick-disconnect couplings and fittings. The all-metal airframe consists of the cabin and tailboom sections. The cabin section was comprised of a series of lengthwise beams interposed with bulkheads. These beams support the skids, transmission, engine, fuel tanks, tailboom, and external cargo hook. A 4,000 pound capacity hook is attached below the transmission in an open bay called the 'hell hole' in GI jargon. The roomy cargo area could accommodate a wide variety of seating, litter, and equipment configurations. Soundproofing material covered cabin interiors, however in combat the material was removed due to its rapid deterioration from use and the elements — Hueys in Vietnam usually flew without doors, nullifying any benefits offered by soundproofing. Flying without doors afforded crews greater visibility, better air circulation, and a quicker escape exit in the event of a crash. The greater portion of the cabin roof area is surfaced with aluminum diamond tread sheeting which served as a walkway. The aluminum skids have full length steel skid shoes and are attached to two arched cross tubes. The tailboom, of semi-monocoque construction, is attached to the cabin section with four high tension bolts. The tail boom supports the variable pitch tail rotor and its drive shaft which is housed in the dome shaped panels running the length of the boom spine and fin leading edge. Also mounted on the tail boom were synchronized elevators — their limited 'angle of attack' was determined by fore and aft cyclic movement. Projecting from the boom's aft end is a tail skid, commonly called the 'stinger', which protects the tail during extreme nose high landings. The engine was mounted horizontally

(Below) The first Huey, XH-40 prototype (55-4459), was initially flown without doors or panels covering the engine and tail rotor drive shaft. The first flight took place on 22 October 1956, powered by a 700 shp Lycoming XT-53-L-1 turbo engine. (US Army Military History Institute)

(Above) The third XH-40 prototype (55-4461) in flight over Texas, carries the numeral 3 on its tail. The production version of the XH-40 turbine powered Helicopter's versatility would revolutionize helicopter aviation. (Bell)

above the center fuselage on a service deck onto which can be attached a 'plug-in' boom hoist, which permits quick engine removal and eliminates ground support equipment.

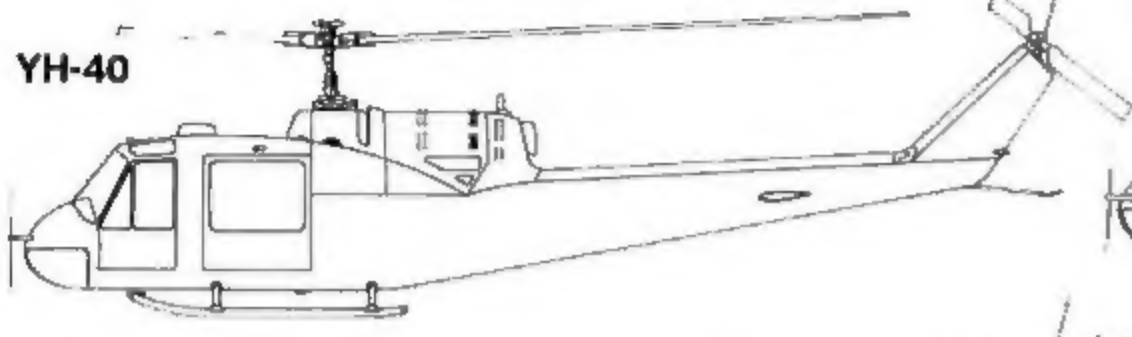
The main rotor mast system, which was canted five degrees forward of vertical, was comprised mainly of a mast, yoke, blade grips and rotating controls. The main rotor was a two bladed, semi-rigid, seesaw type of all-metal construction with a honeycomb core and corrosion resistant leading edge. A stabilizer bar, a Bell innovation which helps provide maneuverability and stability by acting as a gyroscopic reference to which the aircraft returns in normal flight, was added to the second prototype. The first prototype had no stabilizer bar, the second had a stabilizer bar added beneath the rotor head, however, the third prototype introduced the stabilizer bar positioned above the rotor head.



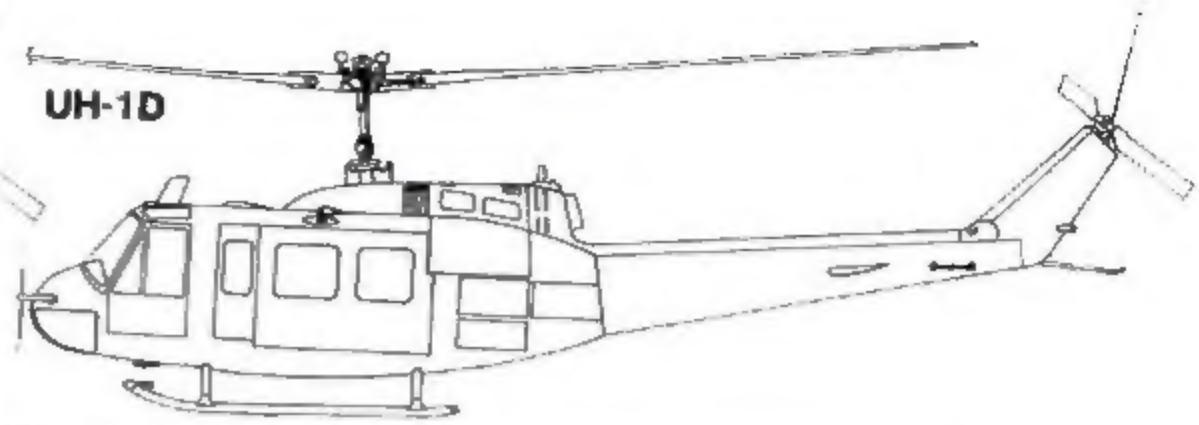
(Below) This YH-40, one of six evaluation machines built, clearly exhibits the significant improvements made over the XH-40 prototype — including the addition of the Bell-developed stabilizer bar mounted above the main rotor, a redesigned air intake and transmission cowling, and the relocation of the synchronized elevators to a more forward position on the tail boom. (Bell)

UH-1 HUEY DEVELOPMENT

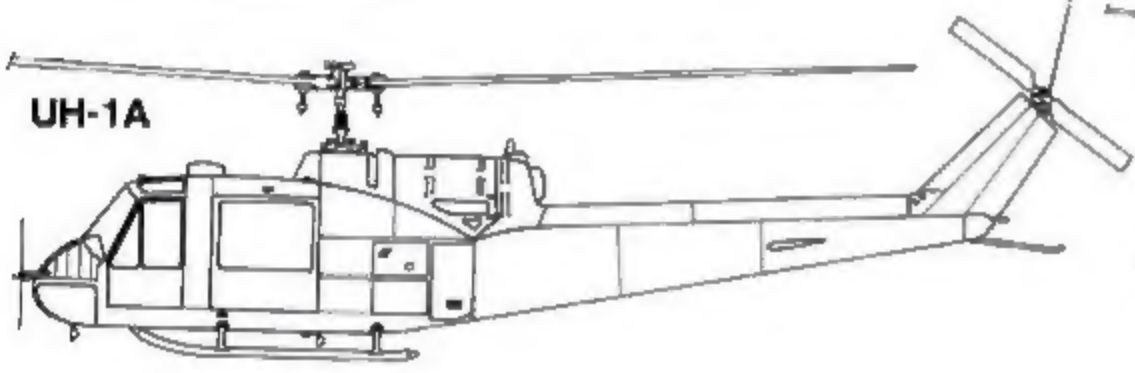
YH-40



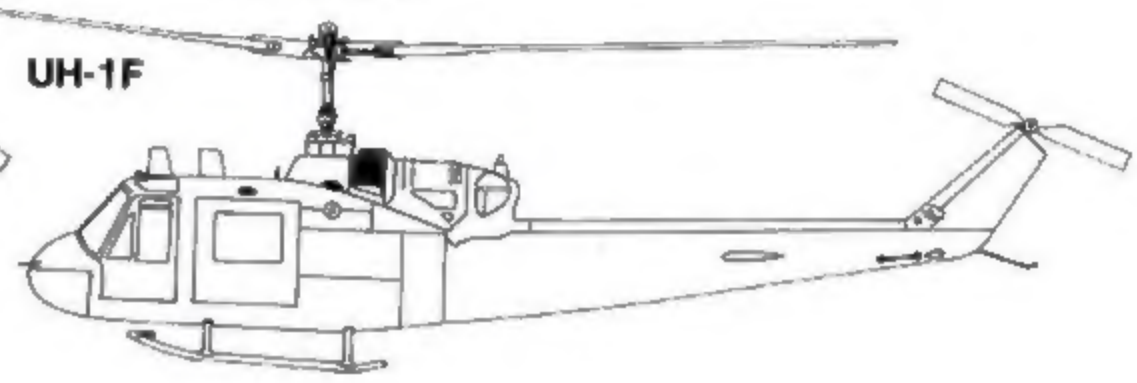
UH-1D



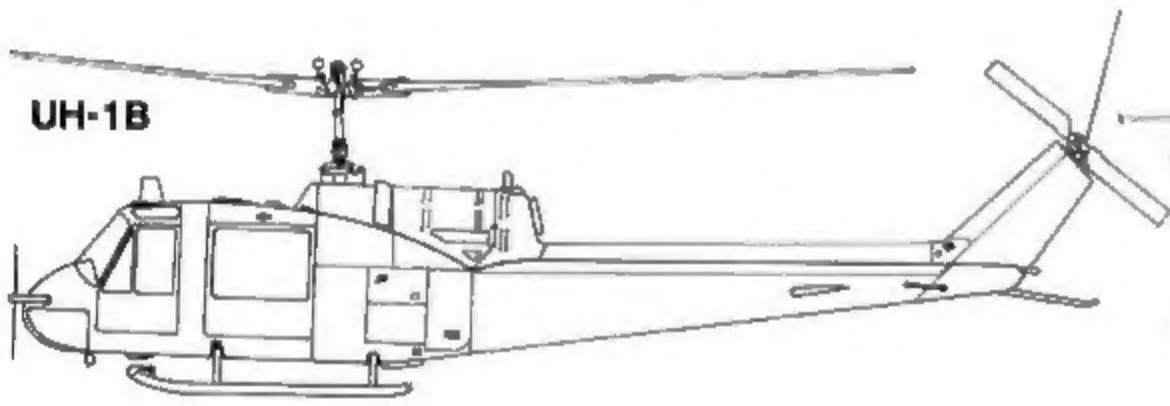
UH-1A



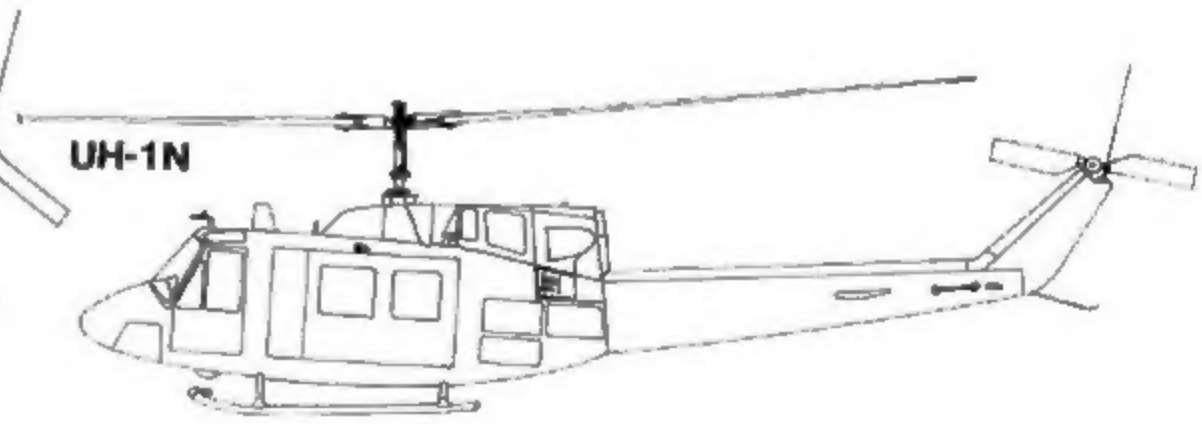
UH-1F



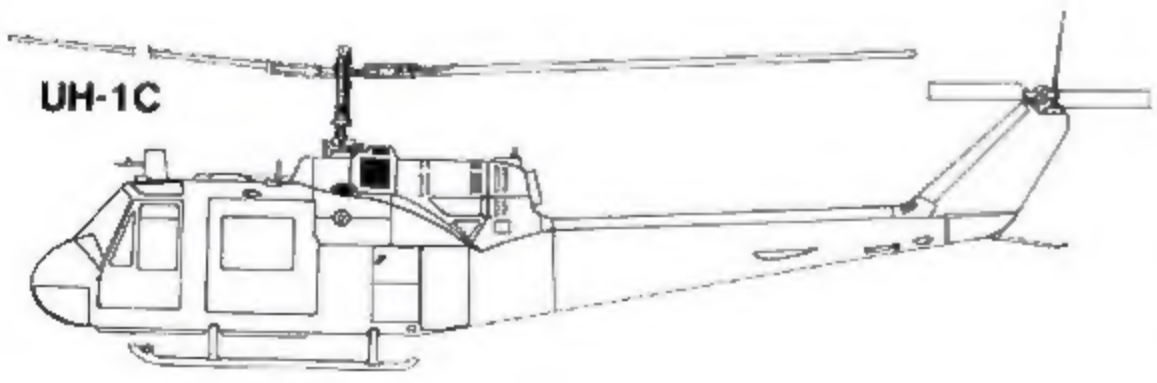
UH-1B



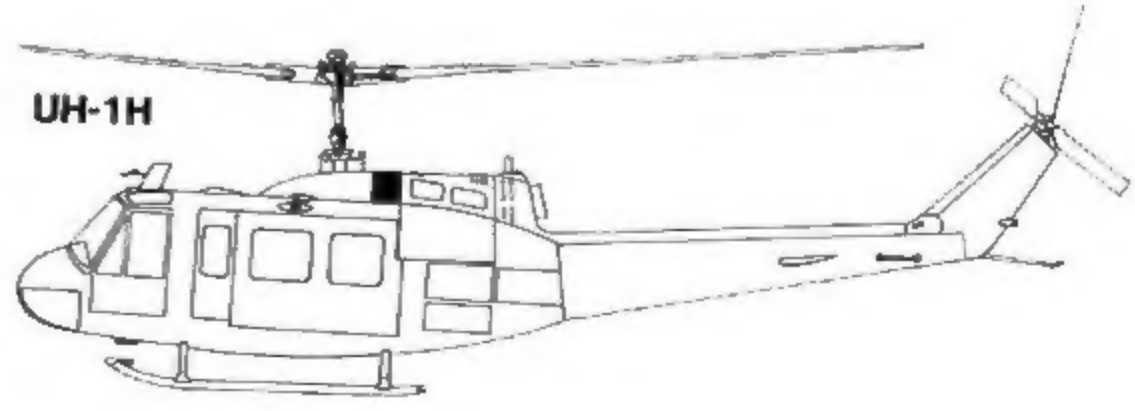
UH-1N



UH-1C



UH-1H



UH-1A Huey

On 23 February 1955 Bell received an order for nine pre-production prototypes simply designated HU-1 (Helicopter, Utility, No 1). The first HU-1 preproduction aircraft flew in August of 1958 powered by a 770 shp Lycoming T-53-L-1A engine.

In March of 1959 Bell received a contract from the Army for 100 production HU-1As. Power was initially provided by the 770 shp T-53-L-1A engine - however from the fifteenth machine onward HU-1As were fitted with T-53-L-5 engines rated at 960 shp. Cruising speed was 80 knots with a maximum speed of 120 knots. The standard 125 gallon fuel tank permitted a range of 163 miles — this could be stretched with the addition of a 165 gallon ferry tank installed in the cargo compartment which was 5 feet long, 7 feet 7 inches wide, 4 feet 7 inches high, and could accommodate two litters mounted width-wise, or six passengers. The co-pilot's seat and controls could easily be removed to provide additional space. Empty weight was 3,930 pounds and gross loaded weight was 7,200 pounds. Overall length was 40 feet from nose to stinger. The 44 foot main rotor had a chord of 15 inches.

The HU-1A first flew in June of 1959 and began entering service the same month with deliveries totaling thirteen aircraft by June of 1961. Most of the initial production run was assigned to the 82nd Airborne Division, the 101st Airborne Division, and the 57th Medical Detachment. HU-1As of the 57th were the first Hueys in Vietnam (arriving in March of 1962) with the unit pioneering the 'Medevac' scenario.

Fourteen HU-1As of the original production order were redesignated as TH-1A trainers, and fitted with dual controls and instrumentation for blind flying.

On 26 May 1960 ten Army Medevac Hueys were airlifted to Chile for disaster relief missions when the country was devastated by earthquakes. The HU-1A earned further distinction from 19 to 26 July 1960 when Army pilots flew an aircraft setting seven world records — the Huey was off to a good start.

The Army, maintaining a policy of naming its helicopters after Indian tribes, *officially* named the HU-1A the Iroquois. However, with the production designation prefix of 'HU', denoting Helicopter, Utility, the GI quickly quickly dubbed it the 'Huey'. Huey it became, and even gained Bell's approval as evidenced by 'HUEY' being embossed on the right directional control pedal of all HU-1s ('BELL' was embossed on the left pedal).

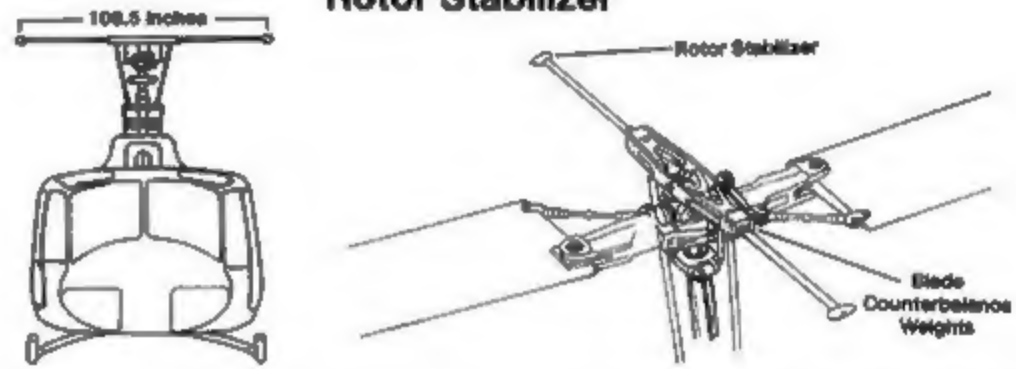
On 18 September 1962 a joint Army-Navy-Air Force regulation was issued by the Department of Defense providing a uniform aircraft designation system. Under this new system the HU-1 Iroquois became the UH-1 Iroquois.

When the Utility Tactical Transport Company (UTTCO) was deployed to Southeast Asia in 1962, the Huey became America's first operational armed helicopter. The Army's H-19 Chickasaw, a large number of H-13 Sioux, and some CH-34 Choctaw helicopters were quickly replaced in favor of the Huey. Five aircraft, one redesignated XH-1A, were used for grenade launcher, rocket, and machine gun tests in 1960. Another UH-1A was redesignated RH-2 (Research Helicopter) and configured as a flying laboratory as part of Bell's research and development program — this experimental Huey featured high resolution radar housed in a large fairing above the cockpit.

In February of 1968 a standard UH-1A became the first aircraft to fly with emulsified fuel. After several short flights it was purposely crashed from a height of 65 feet to test the crash resistance of a nylon type of fuel tank, and experimental fuel lines and seals. No fire ignited, resulting in Bell's optimism over the future use of such fuels.

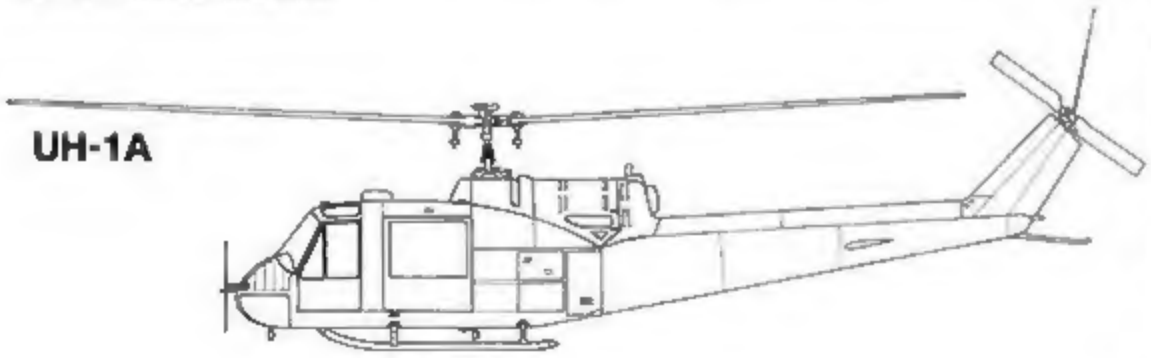
(Above) The fifth HU-1A to be built is being put through her paces for onboard officials. The A model is easily distinguished by its short rotor mast which would be lengthened 13 inches on the later UH-1B. (Smithsonian Institution)

Rotor Stabilizer



(Below) The Bell production line at Hurst, Texas is filled with Hueys still in the early stages of construction. (Bell)

UH-1A



(Above) This early production UH-1A Huey undergoing tests over the Texas countryside, is painted overall Glossy Olive Drab with a Yellow tail band and White lettering. (Bell)

(Below) A UH-1A was fitted with an XM-5 40mm grenade launcher for tests at Springfield Armory in 1962. (US Army)

(Below) One of the first Hueys to serve in Vietnam was this HU-1A of the 57th Medical Detachment in 1962. The unit deployed to Vietnam in March of 1962 and pioneered the 'Dustoff' concept. Serial number 58-2061 was the thirteenth HU-1A built. (Bill Hardy)

(Left) A UH-1A of UTTCO undergoes a rotor head replacement at Tan Son Nhut on 28 November 1962. (US Army)

(Above) An experimental .50 caliber machine gun system mounted on a UH-1A of the 1st Armored Division is being loaded at Ft.Stewart's Metz Firing Range in late 1962. (US Army)

(Below) A 2.75 inch rocket installation is added next to the .30 caliber machine gun on this UTTC UH-1A at Tan Son Nhut, South Vietnam.

U-1B Huey

In June of 1959, the same month that the HU-1A was first delivered, the Army, recognizing the need for a more powerful version of the basic Huey design, contracted for the B model. Four prototypes were ordered powered by a Lycoming T-53-L-5 rated at 960 shp with the first flight being made on 27 April 1960. Other significant changes were made to the B series including a rotor blade chord increase to 21 inches. The fuselage was lengthened by 2 feet 7 inches, enlarging the cabin to accommodate eight troops or three stretchers. The rotor mast was heightened 13 inches and the blade counterweights were positioned above the rotor. The UH-1B had a less critical center of gravity, the cabin cargo capacity was increased by nearly fifty percent, and gross weight was increased to 8,500 pounds. Rotor blades constructed of aluminum honeycomb replaced the spar construction used on the UH-1A — this change offered an improved strength to weight ratio of the main blades. The UH-1B carried 165 gallons of fuel. In May of 1964 one of the YUH-1Bs set the world helicopter speed record by flying 222 mph.

Armament provisions were made for mounting the XM-6 quad M60C machine guns and clusters of 2.75 inch rockets. User evaluation testing by the Army Aviation Board began in November of 1960. The Army procured a total of 1,010 UH-1Bs, with the first production machine being delivered in March of 1961. The Army used the 'Bravo' model extensively as a trainer and test platform for the SS-11 missile. In November of 1962 eleven UH-1Bs arrived in Vietnam to augment the UH-1As in use by UTTCO. The UH-1B eventually replaced the remainder of the CH-34s, and by June of 1963 most light helicopter companies had transitioned to the UH-1B which rapidly became the Army's standard troop carrier and gunship.

However, since the UH-1B had not been designed as a gunship the addition of armament considerably reduced speed and maneuverability. Once weapons systems were added, the UH-1B had to be excluded from use as a troop carrier, pointing up the need for a further improved variant. As a production line change late UH-1Bs were upgraded with the T-53-L-9 and L-11 turbines rated at 1,100 shp.

The UH-1B would be the basis for a number of refined armament systems in Vietnam as well as serving as the basis for the Army 'C', the Air Force 'F', and the Marine 'E' variants.

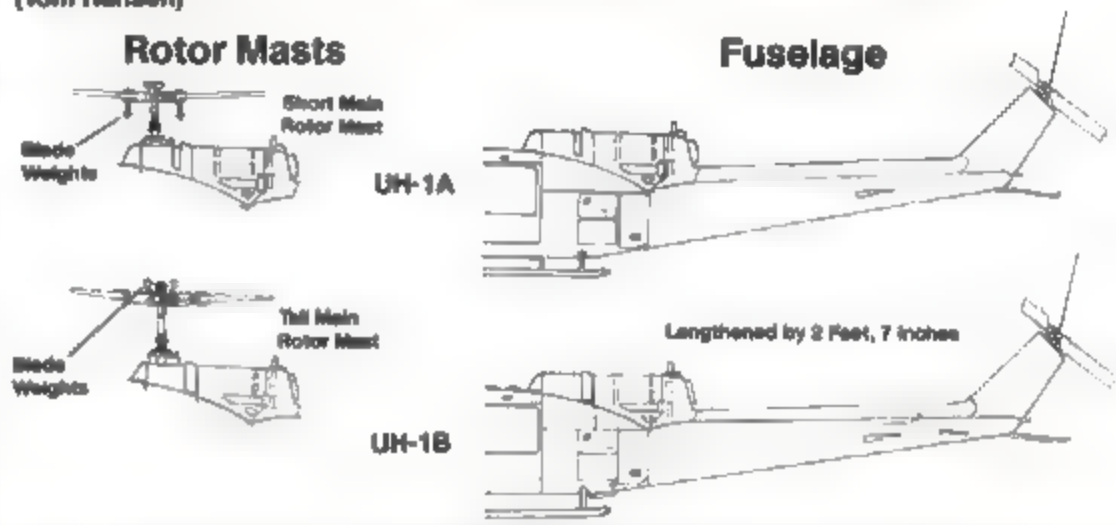
Bell 204B

The commercial version of the UH-1B was the Bell Model 204B and could be differentiated by its 48 foot rotor, ten seats, and fuselage which was stretched two feet to accommodate a baggage compartment. Production of the 204B ran from 1963 to 1967. The B series was the first Huey to be produced under license by Agusta in Italy and Fuji in Japan. The Agusta 204B used a Bristol Siddely Gnome engine, while the Fuji 204B was powered by a T-53-L-13 rated at 1,400 shp and mounted the tail rotor on the boom's right side. During 1962, Bell delivered sixteen aircraft to the Royal Australian Air Force (RAAF) which designated them A2s and used them for search and rescue. Other foreign customers included the Royal Australian Navy which ordered three Bs, redesignating them N9s. Norway ordered for four aircraft. Another milestone occurred in 1967 when the Los Angeles County Fire Department became the first municipality to purchase the 204B. The B also gained distinction in the record setting arena when a high-performance configuration flew more than 170 mph in March of 1963.

NUH-1B

This was a single aircraft (64-18261) used for test purposes.

(Above) One of the first UH-1Bs built, this 1960 vintage Huey was assigned to SHAPE in Germany. Glossy paint and high visibility markings were standard during the early 1960s (Tom Hansen)



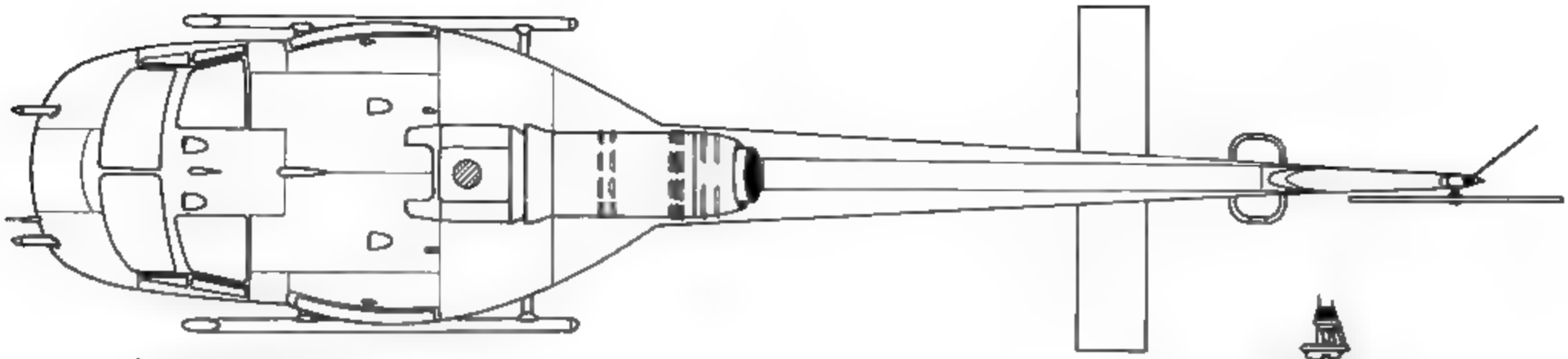
(Below) A swarm of UH-1Bs, carrying the training colors of Olive Drab and Orange, made an impressive sight and sound on pilot graduation day at the Army Aviation School at Ft Rucker, AL. (US Army)

(Above) The Huey design provided excellent visibility even from the cargo compartment, especially with the doors off. The increased cabin area of the UH-1B was a welcome addition. (Bell)

(Above) Installation of the 2.75 inch rocket kits could be done quickly and easily, and provided tremendous firepower to the Huey. (US Army)

(Below) A brand new UTTCO UH-1B undergoes armament installation at Tan Son Nhut AB in Vietnam during February of 1963. The Huey mounts a factory-installed 7.62 machine gun and a 2.75 rocket kit. The pilot's seats were later replaced by armored versions. (US Army)

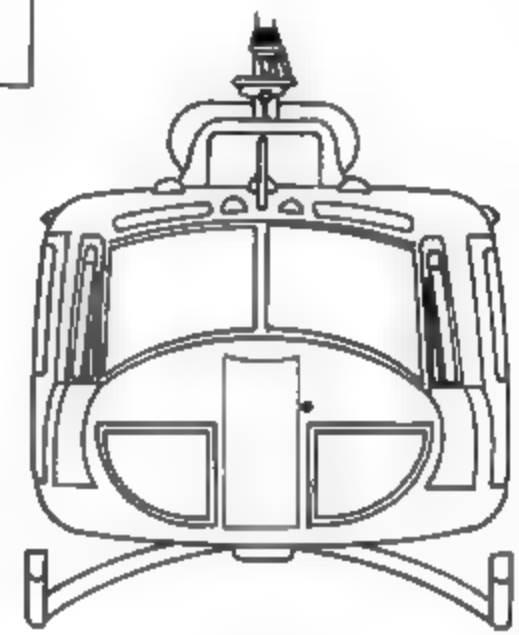
(Below) A UH-1B of the 120th Assault Helicopter Company (AHC) unleashes a rocket on an enemy position in Vietnam. The door gunner covers the Huey as it completes its run. A graduation mortarboard is painted ■ White on the fin. (Bell)

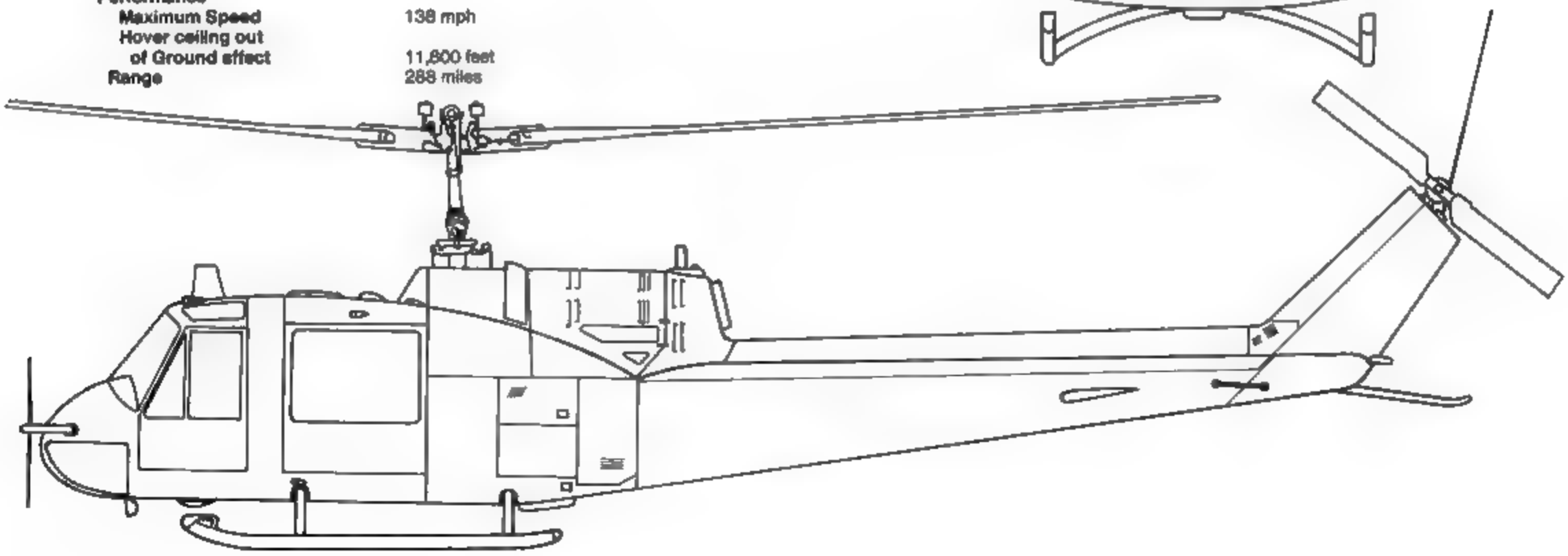


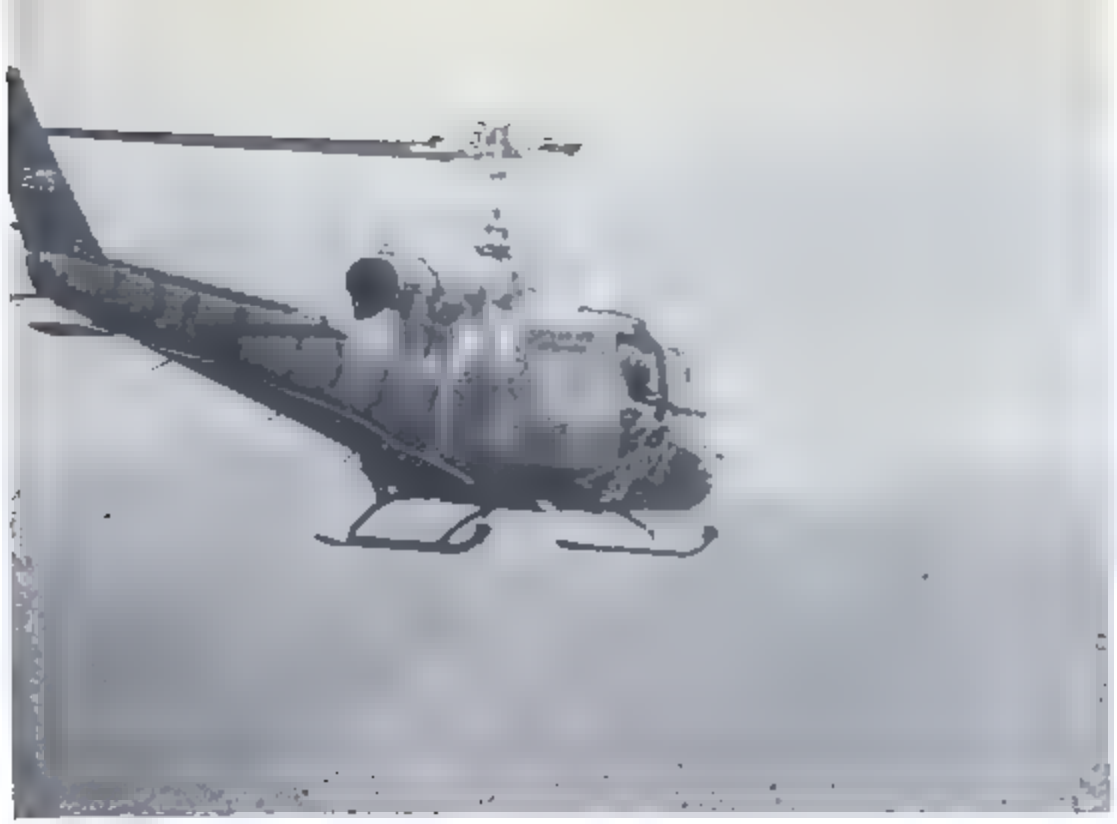
Specifications

UH-1B Iroquois (Huey)

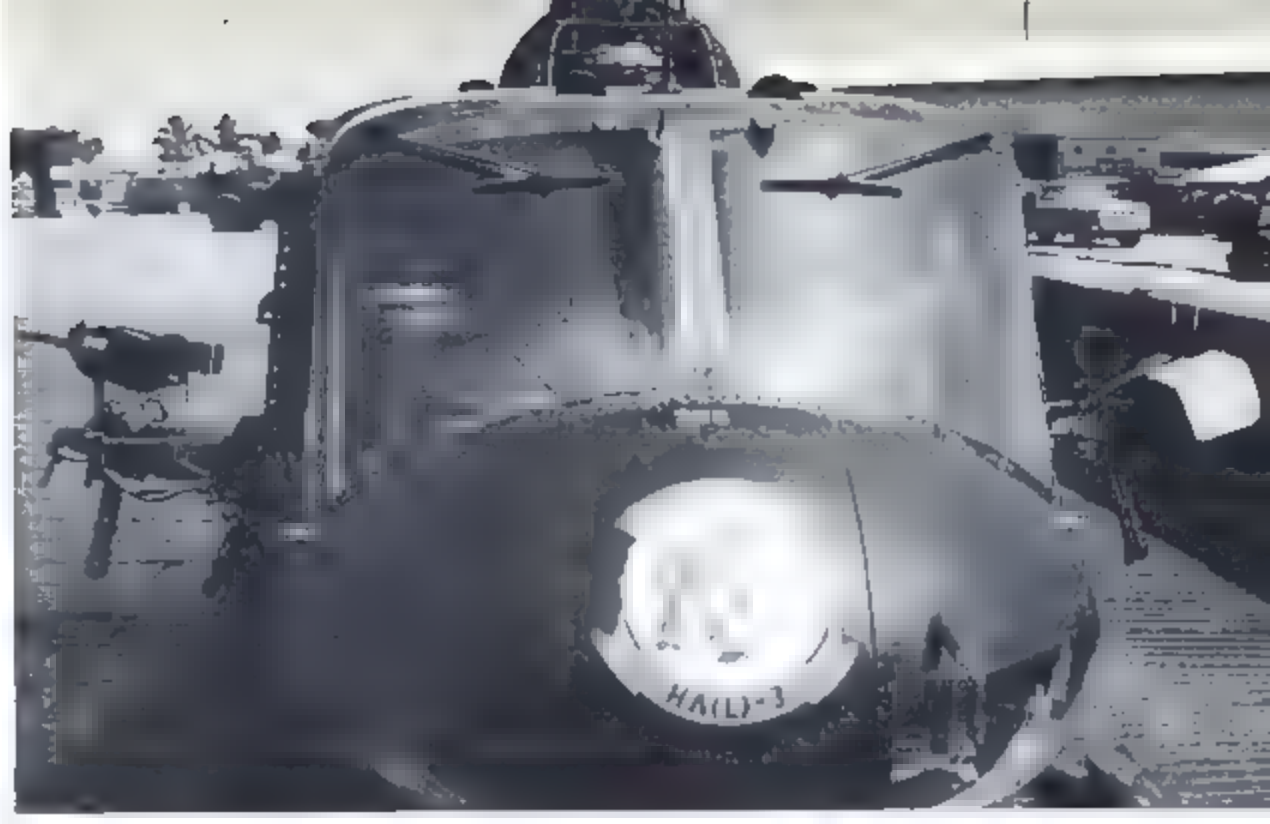
Fuselage Length	38 feet 5 inches
Height	14 feet 7 inches
Empty Weight	4,502 pounds
Maximum Weight	8,500 pounds
Powerplant	Lycoming T-53-L-5 T-53-L-9 T-53-L-11
Performance	
Maximum Speed	138 mph
Hover ceiling out of Ground effect	11,800 feet
Range	288 miles







(Above) Early in the Vietnam war, Army aviation units experimented with a variety of camouflage schemes. This pattern of Gloss Black and Light Brown over Olive Drab was unique to the UH-1Bs of the 117th Aviation Company in 1964. HF antennas can be seen on both sides of the tall boom. (Cary Shelton)



(Above) One of the UH-1Bs used by HA(L)-3 'Sea Wolves' in 1969. The 'Seawolves' acquired a number of UH-1Bs from the Army to support 'Market Time' operations in the southern regions of Vietnam. (Bob Cooney)

(Below) The 'gun' platoon of the 114th Aviation Company at Vinh Long, Vietnam used UH-1B Hueys in 1965. This example carries the unit markings of a Cobra on the nose. The White roof area aided in recognition from above. An XM-6 quad machine gun armament system is mounted along with a makeshift smoke grenade 'drop tube'. Eleven Purple Hearts are visible on the door post. (Charles Counts via Geneva Warren)

(Below) The UH-1B would serve as the standard 'slick' for most of the Vietnam War. (Bell)

UH-1C Huey Gunship (Huey Hog)

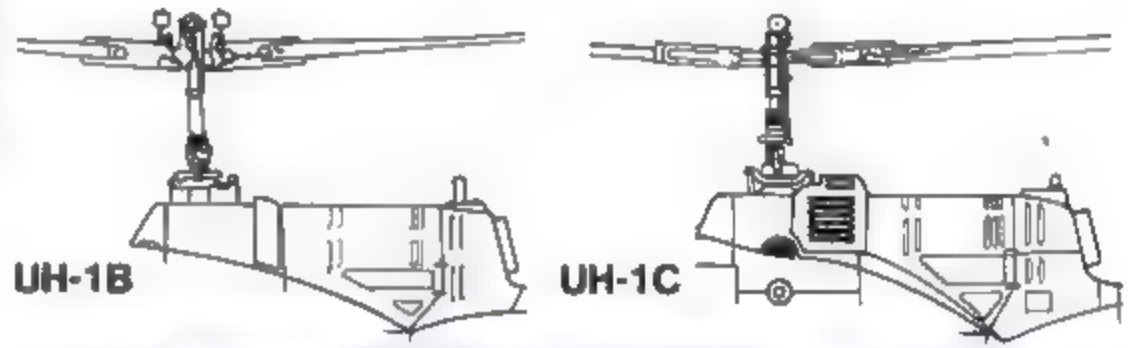
The 'Charlie' model, the UH-1C Huey was developed as a gunship when the UH-1B exhibited reduced performance when configured as a gunship. However, since Bell and the Army realized the need for a helicopter designed specifically for the gunship role, the UH-1C was seen as an interim gunship and in retrospect is often considered one of the great innovations of the Vietnam war. Known as the Huey Hog in Vietnam, the UH-1C was, a make-shift, though quite ingenious armament system put in use while the AH-1 Cobra Gunship was being developed.

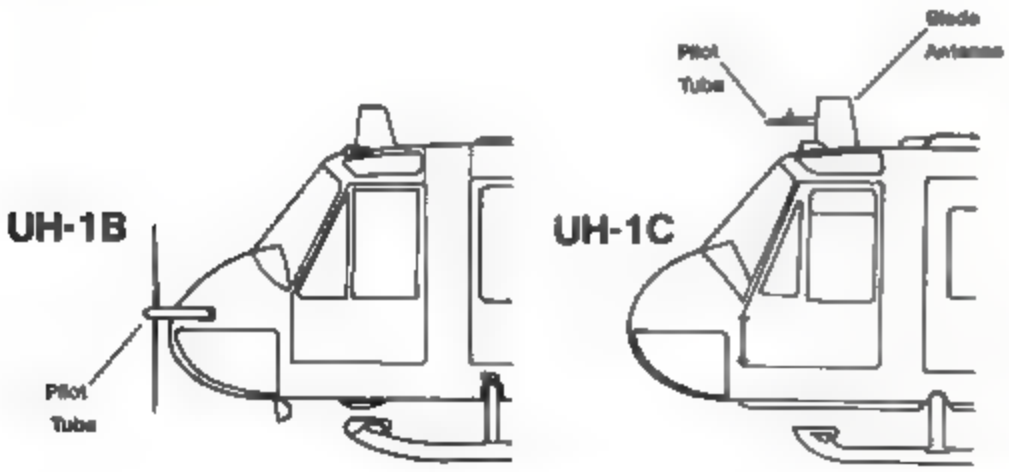
The UH-1C was actually on the Bell Helicopter drawing boards as early as 1960 and succeeded, out of order, the UH-1E and UH-1F models. Originally designed as a transport and gunship, the C design was essentially an uprated UH-1B model. The UH-1C had some very important changes which boosted the gross weight to 9,500 pounds, speed to 140 knots, and afforded excellent maneuverability. A new rotor system similar to the type tested on a record-breaking YUH-1D in 1964 was simpler and stronger. This '540' rotor head incorporated 27 inch chord blades which provided greater lift. These blades, combined with the installation of the more powerful T-53-L-9 and later the T-53-L-11 engines (1,100 shp), required a different vertical fin and synchronized elevators to compensate for the increased torque. The new larger fin was cambered 7 degrees and larger asymmetrical elevators were fitted to the tail boom. Later Army models, when fitted with the T-53-L-13 engine rated at 1,400 shp, were designated UH-1Ms. The improved engines in the UH-1C models necessitated an increased fuel capacity to 242 gallons. The fuel filler was relocated to the left side of the fuselage versus the right side on the B model, and White position lights were added to either side of the vertical tail boom end replacing the single light of previous Hueys.

Differentiating the UH-1C from a UH-1B is not easy — since the Bravo model suffered crashes from tailboom failures and many were retro-fitted with Charlie model tailbooms after 1965. When idle, the 540 rotor blades of the Charlie had a noticeable droop whereas those on the Bravo model angled upward. Other changes included the relocation of the nose antennas and pitot tube to the cabin roof. As an added safety feature the UH-1C had parallel hydraulics system installed. Some of these changes were made as production line changes and included the addition of engine intake screen kits fitted to UH-1Cs in the field in Vietnam during 1967. A total of 766 Charlie models were built — of these, five were built for the Royal Australian Navy under the designation of N9, and another five were produced for Norway. During the Vietnam war, the US Navy 'Seawolves' (HAL-3) used two UH-1Cs obtained from the Army for its support of delta operations.

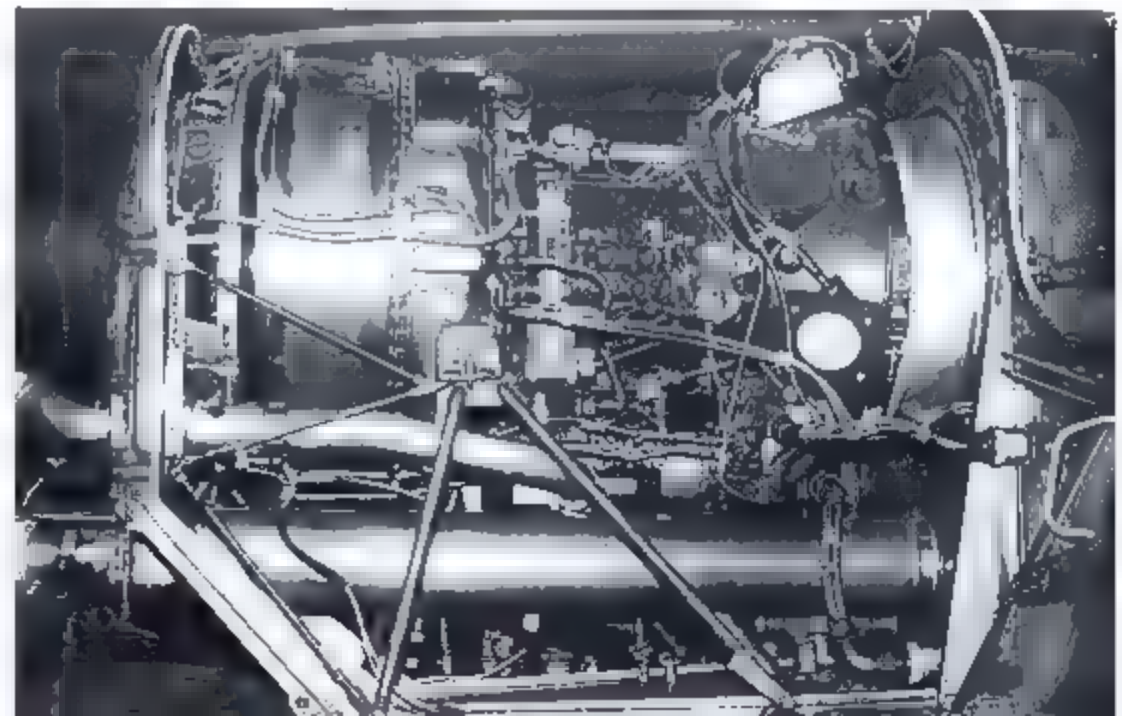
(Above) A UH-1C of the 57th AHC Cougars at Phu Cat. Designed specifically as a gunship the UH-1B was capable of carrying a wide variety of armament and is considered by many to be one of the great innovations of the Vietnam War. (Norm Taylor)

Engine Cowling And Rotor



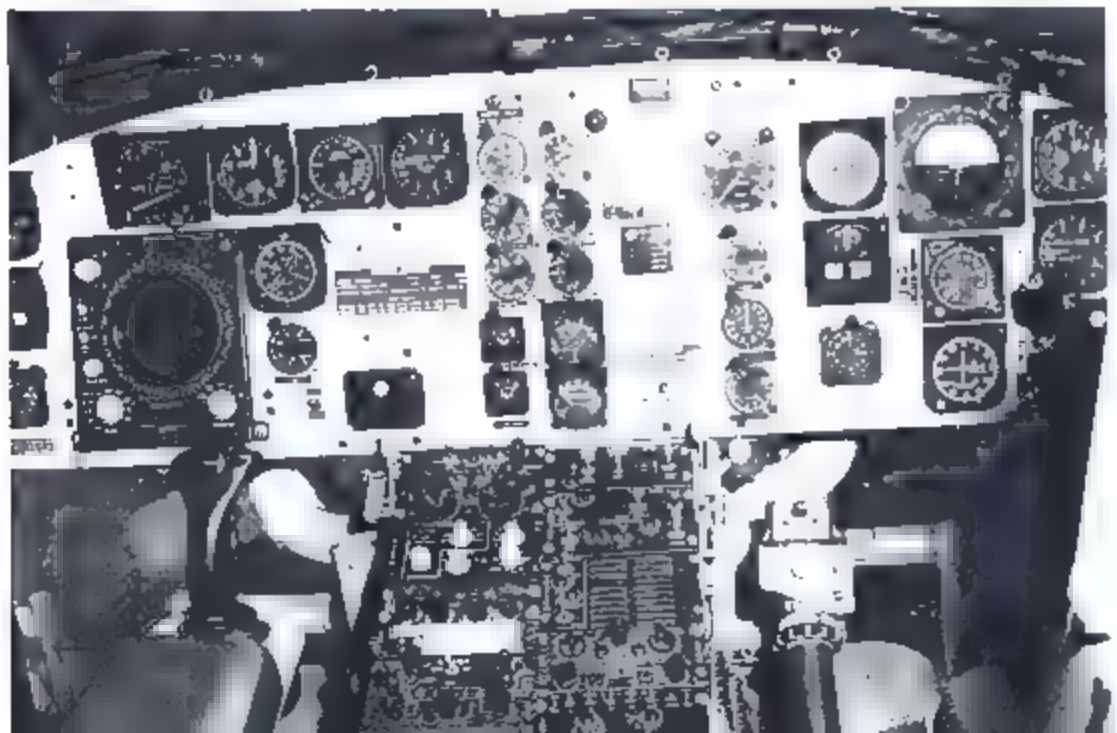


(Right) The UH-1C was initially powered by a Lycoming T-53-L-9 engine and later with the 1,100 shp T-53-11 engine. These more powerful engines required a larger vertical fin and synchronized elevators to compensate for the increased torque. (Bell)

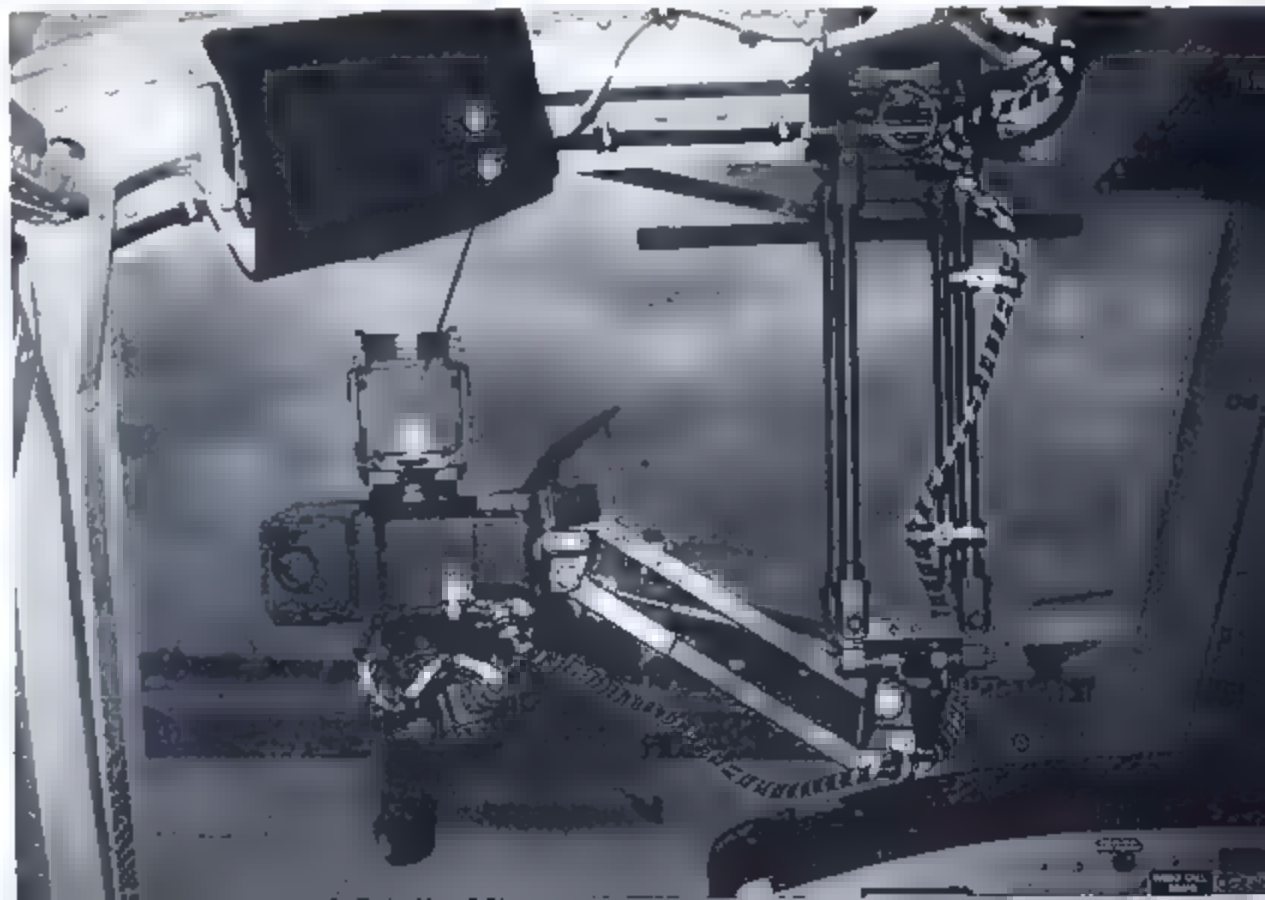


(Above) This UH-1C carries markings from two different units in Vietnam nullifying any attempt at identification — evidently the pilot's door came from the 57th Assault Helicopter Company (AHC), and the Cobra on the tail fin was used by the 129th AHC. This gunship at Phu Cat in 1971 mounts XM-159 rocket pods and an early type M60 Sagami mount. A wind baffle has been attached to the door post. The diamond on the Huey in the background was carried by any number of units. (Norm Taylor)

(Below) The HU-1C Huey Hog instrument panel with screens for the Helms radar. (Bell)

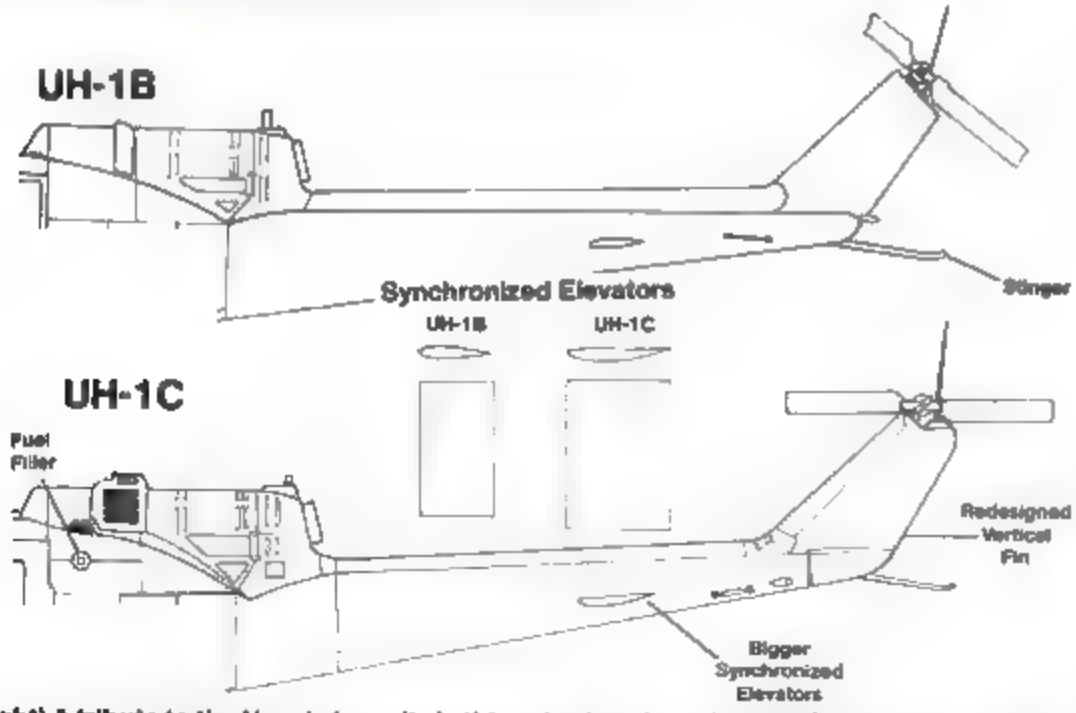


(Below) The sighting and trigger assembly of the M-21 armament system could be moved out of the way when not in use. (Bell)



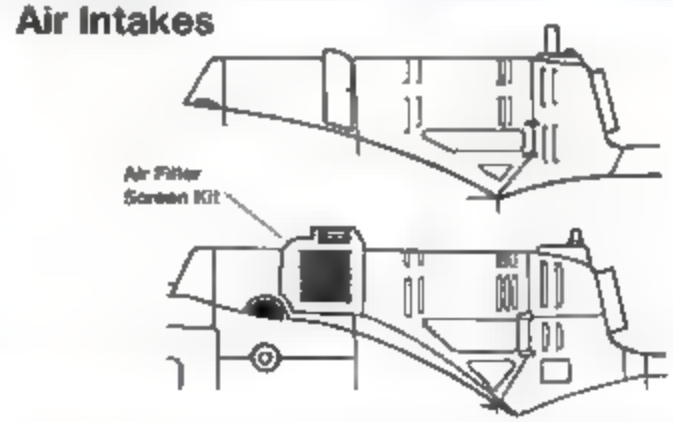
(Above) UH-1C Huey Hog of the 3rd Platoon, 114th Assault Helicopter Company armed with an XM-3 2.75 inch rocket system. (Eugene Schwanebeck)

(Above) UH-1C gunship 'Cobra Duke' armed with rocket pods at Lane Heliport. (George Frisbee)



(Right) A tribute to the Huey's tenacity is this sobering view of a UH-1C which 'threw' its tail rotor near Chu Lai, while fully loaded with fuel and rockets. The pilot landed 'Musket 36' of the 176th AHC without problem. The accident, which caused a rotor to pierce the skull emblem on the tail, occurred in 1959. (David Grieger)

(Above) UH-1C HOGHEAD of Cobra V carrying twelve rocket tubes on each side and the nose mounted 40mm automatic grenade launcher. (E. Schwanebeck)



(Left) UH-C of the 119th AHC Crocodiles at Camp Holloway, Pleiku, carrying the XM-3 rocket launcher system. (R. Steinbrunn)

UH-1D Troop Transport (Slick)

The Delta model, the UH-1D which marked the introduction of the 'long fuselaged' Huey, was the result of the Army's decision to upgrade the Huey as a tactical troop transport. Designed as an upgrading of the basic UH-1B design, seven prototypes were contracted for in July of 1960. Just two weeks earlier, Army and Air Force officials had inspected a full scale mockup of the YHU-1D (YUH-1D after 1962) at Bell's Hurst, Texas Plant. The initial prototype flew for the first time on 16 August 1961 — for the next two years this aircraft and the remaining six YUH-1Ds underwent a plethora of vigorous tests and flight evaluations. Since the Delta model was built around the proven Bravo model, Bell was able to forgo the long term development cycle usually associated with the introduction of new mass-produced aircraft. During this period the YUH-1D distinguished itself in the record breaking arena by setting new records for speed, distance and time to climb.

Based on the UH-1B the Delta offered vast improvements over its 'short fuselage' predecessors. The most notable change of course was the fuselage being stretch by 3 feet 5 inches permitting a passenger load of fourteen troops — a fifty percent increase in the 220 square foot cargo area which could also accommodate six litters — twice that of the Bravo model. Fuel capacity was increased by thirty-four percent (to 242 gallons) and was redistributed to maximize usable cabin space — range was increased to 293 miles. One of the 'stretched' Huey's most distinguishing features was its pronounced 'nose up' attitude while sitting on the ground. Larger sliding cargo doors with double windows were added to each side of the cabin, and a narrow auxiliary door was added on each side of the fuselage in front of the new wider cargo doors, further widening the cabin loading area. This auxiliary door, with is own window, swung outward and was easily removed. The YUH-1D was equipped with the 1,100 shp T-53-L-9 engine driving a 44 foot main rotor, a carry over from the Bravo model. The ninety degree tail rotor gearbox atop the vertical fin was faired over on the YUH-1D version, and a stabilizer, angled upward from the fin's top right side, replaced the elevators seen on the B model tailboom. Initially featured on these prototype Deltas were louvre-type air inlet fins on the elongated transmission housing. Throughout their service life the YUH-1Ds underwent various test modifications — most notable among these was the installation of a twin turbine engine in serial 60-6030 as a proof-of-concept unit which made its first flight on 29 April 1965.

The first production 'Delta' model was accepted by the Army on 31 May 1963 with deliveries to Army units beginning on 9 August 1963. The prominent receiving unit was the 11th Air Assault Division at Fort Benning, GA which was formed to prove the Army's airmobile concept. Evolving into the famed 1st Cavalry Division, the unit had the distinction of being the first to take the Huey into combat. From 1962 to 1966, a total of 2,008 UH-1Ds were delivered to the Army. Only a small number of early Delta models were powered by the T-53-L-9 engine, while at least two thirds of the UHs were built with the T-53-L-11 engine, and the balance had the T-53-L-13 installed installed. Production Deltas were fitted with a 48 foot main rotor with a 21 inch chord, requiring that the tailboom be lengthened 1[illegible] inches to provide clearance for the vertical fin — bringing overall length up to 41 feet 6 inches. The added length is evident by the dual plane of the ventral tailboom whereas the symmetry of the prototype tailboom is unbroken. Except for an experiment with tail stabilizers on the prototypes, production Delta models, like Bravo models, were fitted with boom mounted synchronized elevators, though larger than those on the B. UH-1Ds had universal hard point fittings in four locations to which could be mounted auxiliary fuel tanks and a wide variety of weapons systems.

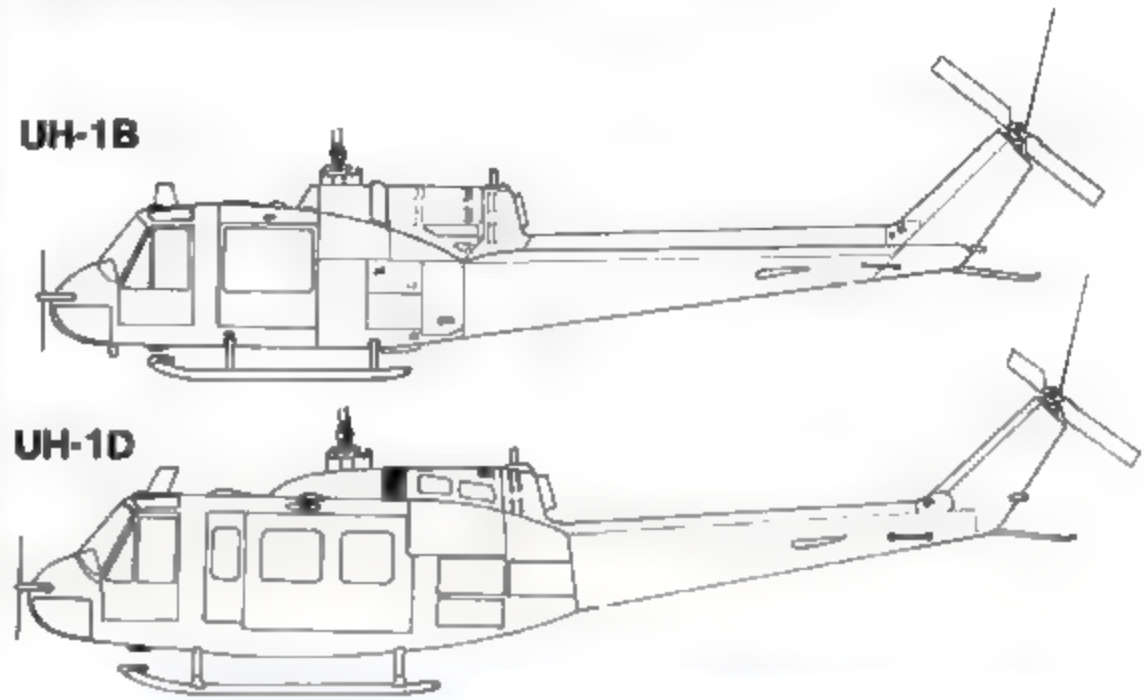
The Army used the UH-1D mainly in the transport role with the majority being fitted with XM-23 M60D machine guns on the two aft hard points. The absence of heavy weaponry accounted for the term *slick* used during the Vietnam war. The exception to this took the form of heavily armed UH-1D gunships used in Vietnam by the Royal Australian Air Force (RAAF) and the Vietnamese Air Force (VNAF). On 7 January 1969, the first of forty-five UH-1Os borrowed from the Army by the Navy arrived at NAAS Ellyson Field, FL. They were assigned to the Navy's Helicopter Training Squadron 8 (HT-8) as an interim replacement for the H-34 until the arrival of the Navy's own Hueys scheduled for the Fall of 1970.

(Right) The first YUH-1D made its maiden flight on 16 August 1961. Evident on this, the first 'stretched' version of the Huey, is the singular plane of the ventral tail boom which sets it apart from production UH-1Ds. (Bell)

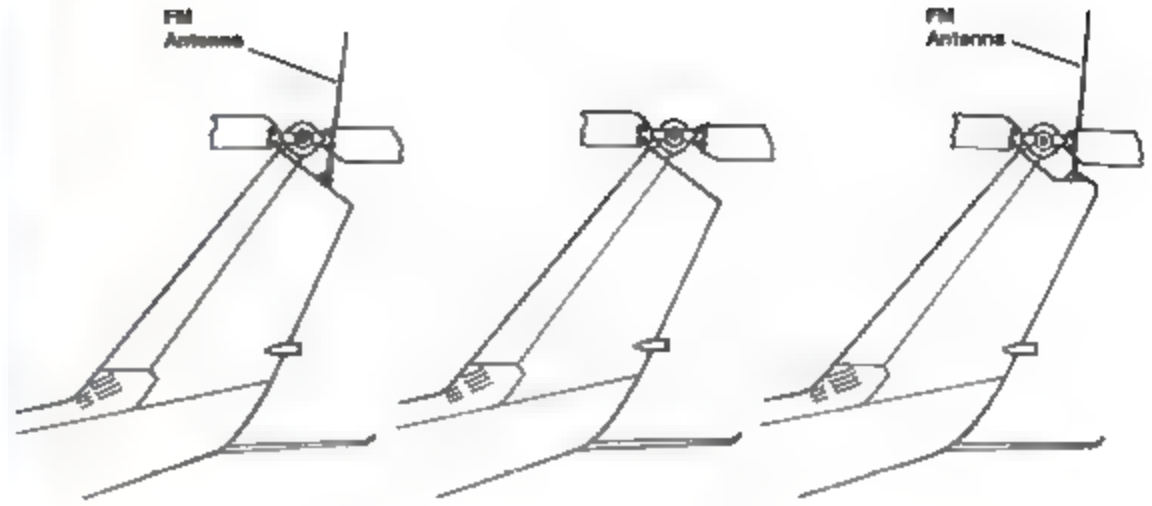
Beginning in 1965, UH-1Ds were manufactured with screened air intake sand and dust separators which replaced the louvered fairings on the initial production machines. This system comprised sponge-type inserts which were removable for cleaning. Production of the UH-1D topped out at 2,561 aircraft with 352 being built under license by Dornier in Germany for the German armed forces.

Bell 205

The UH-1D's commercial counterpart was the model 205, known as the 'Hotel' model Huey, and was powered by the T-53-L-13 1,400 shp engine.



(Above) The FM antenna mount on the tail of the UH-1D. (Bell)



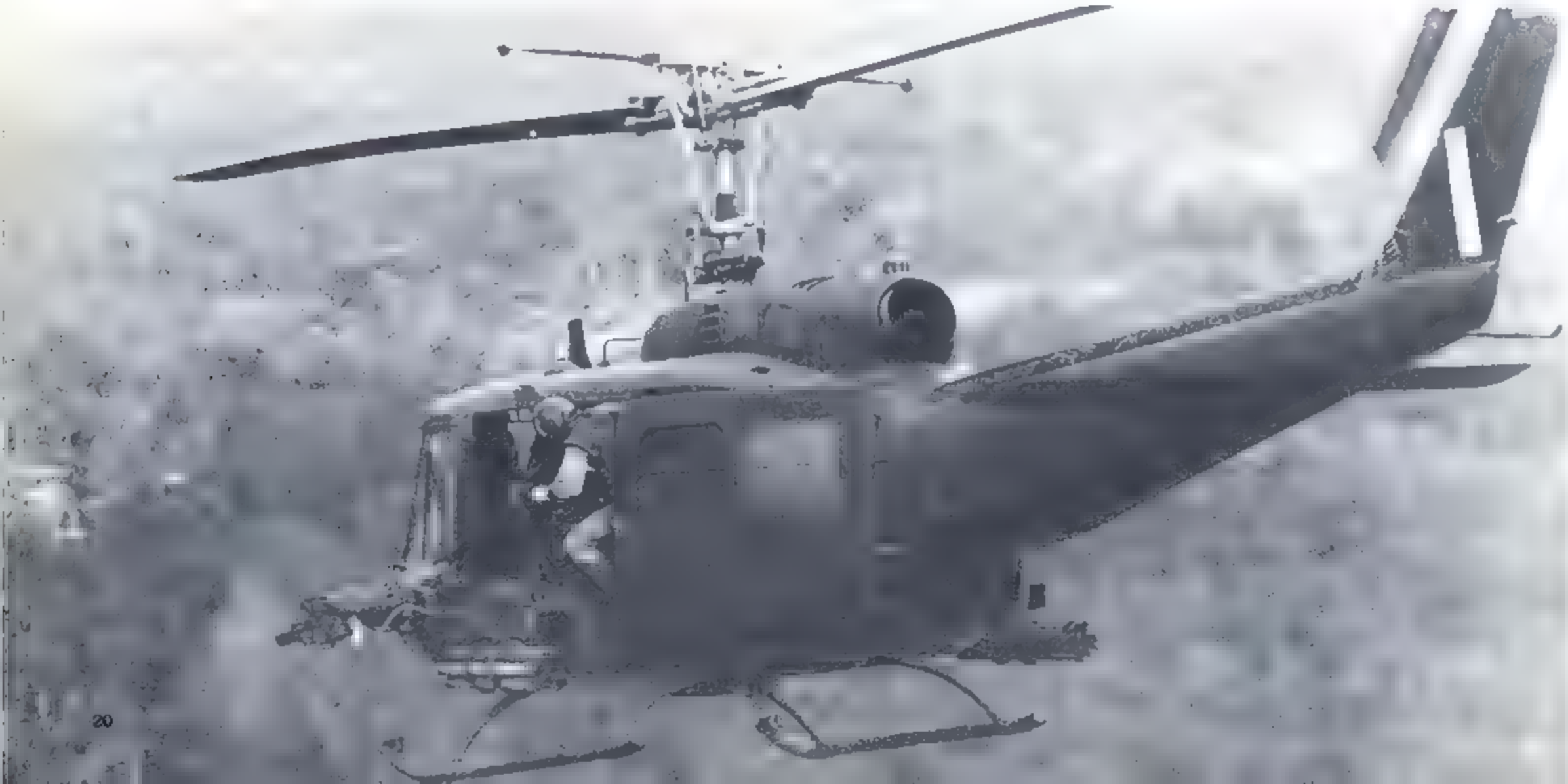
(Below) UH-1Ds landing troops among rice paddies. (Bell)

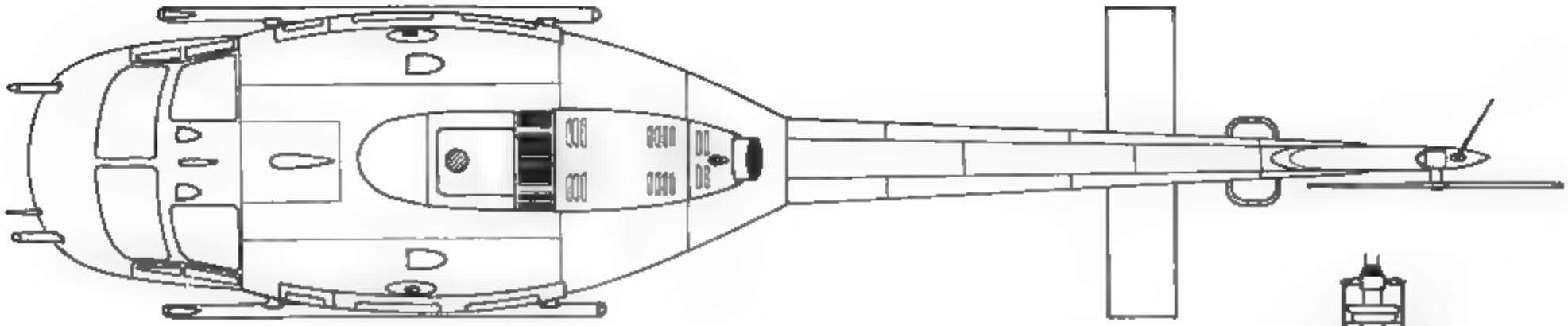
(Below) The instrument panel of the UH-1D 'slick' was somewhat sparser than the heavily armed UH-1C Huey Hog. (Bell)

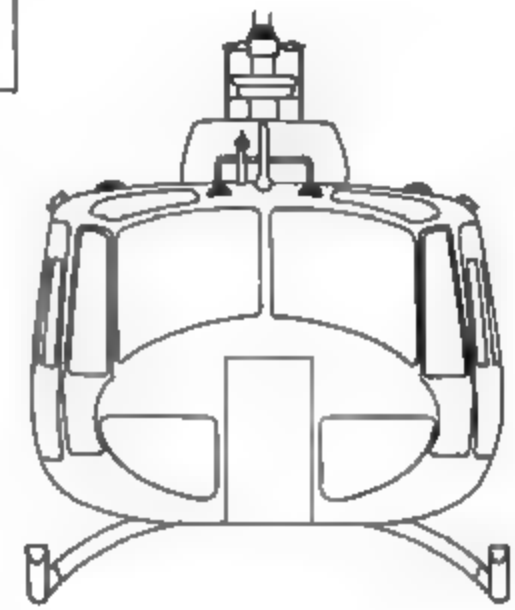
(Above) A Platoon of UH-1Ds in a line astern on their way to a landing zone was a typical scene in Vietnam. (George Frisbee)

(Below) The most heavily armed UH-1Ds in Vietnam were those used by the Australians and the Vietnamese. (Bell)

(Above) Shortly before it was 'sling-loaded' back to its home base, this UH-1D 'slick' of the 173rd AHC 'Robin Hoods' was riddled with enemy fire (including two rockets which hit the left front) during a combat assault mission near Can Giuoc, Vietnam on 8 January 1968. All fourteen Hueys participating in the mission were damaged with three being shot down. This Huey served as the mount for Specialist 4 Gary Wetzel who distinguished himself by repelling a VC attack while terribly wounded. For his actions, Wetzel received the Medal of Honor. (via Gary Wetzel)



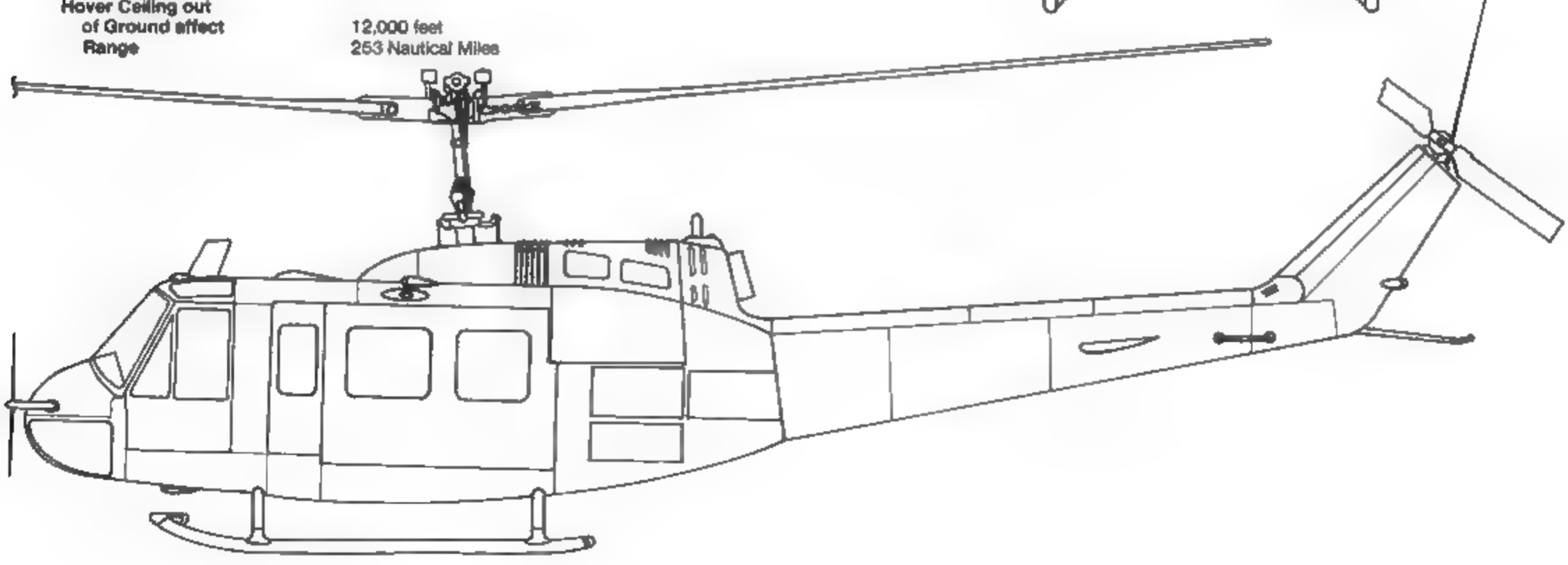




Specifications

UH-1D Iroquois (Huey)

Fuselage Length	41 feet 6 inches
Height	11 feet 6 inches
Empty Weight	4,920 pounds
Maximum Weight	9,500 pounds
Powerplant	T-53-L-9 T-53-L-9A T-53-L-11
Performance	
Maximum Speed	120 Knots
Hover Ceiling out of Ground affect	12,000 feet
Range	253 Nautical Miles



(Above) Other Huey crews rush to rescue the crew of this 'slick' of the 176th AHC shot down near Binh Sonh. (Davie Grieger)

(Above) One of forty-five Army UH-1Ds loaned to the Navy in 1969 pending the delivery of Navy Huey trainers. The aircraft were assigned to HT-8 at Ellyson Field, Pensacola. (US Navy)

(Below) West Germany purchased two UH-1D from Bell and eventually license built 352 UH-1Ds. (Bell)

(Above) While most of the West German built UH-1Ds went to the Army, the Luftwaffe also received a large number. (Manfred Faber)

(Above) The West German Navy tested the UH-1D equipped with floats in November of 1964. (Bell)

(Below) A factory fresh 205 produced under license in Italy by Agusta Bell. The Italian stencils just aft of the synchronized elevators include the designation 'UH-1D'. The main rotor blade has been anchored to the tail boom to prevent movement by the wind. (Tom Hansen)

UH-1H

Many UH-1Ds were upgraded to UH-1Hs by retrofitting them with the T-53-L-13 powerplant, the relocation of the nose mounted pitot tube and the addition of a blade antenna to the cabin roof. The H had a maximum gross weight of 9,500 pounds. After 1969, UH-1H (and D) models were fitted with 'crash-worthy' fuel systems, decreasing the 242 gallon fuel capacity to 220 gallons. The H program began on 4 April 1966 when the Army contracted for two YUH-1H test aircraft. Deliveries began in September of 1967 eventually totaling nearly 5,000 examples to the Army by 1982. For over a decade the UH-1H was the mainstay of the Army's helicopter force; however, being a product of 1950s technology, it had limitations in meeting the later increased requirements of load capacity and survivability. But while the Sikorsky H-60 Blackhawk is now replacing the Huey, the Army has retained over 2,000 UH-1Hs which have been modified to enhance their survivability. These improvements include an IR suppressor, a doppler navigation system, redesigned composite rotor blades, fire-safe fuel system, and greatly improved electronics and communications gear. The Canadian armed forces ordered the H model in 1967, receiving their first aircraft on 6 March 1968. Initially designated the CUH-1H, the Canadian UH-1H variant was redesignated to CH-118. Besides deliveries to Australia and New Zealand, UH-1Hs were built under license by Germany, Italy, Japan, and Nationalist China.

Bell 205A-1

The commercial equivalent of the H series was the 205A, upgraded to the 205A-1 in 1969. In the civilian role the 205 variants are used primarily for passenger service, air freight, flying crane, and fire-rescue work. These models vary little from the military H except for optional refinements to better adapt them to civilian use. These options include float gear, improved electronics, rotor brakes, customized interiors, and boarding steps. Later variants had their tail rotors mounted on the right side.

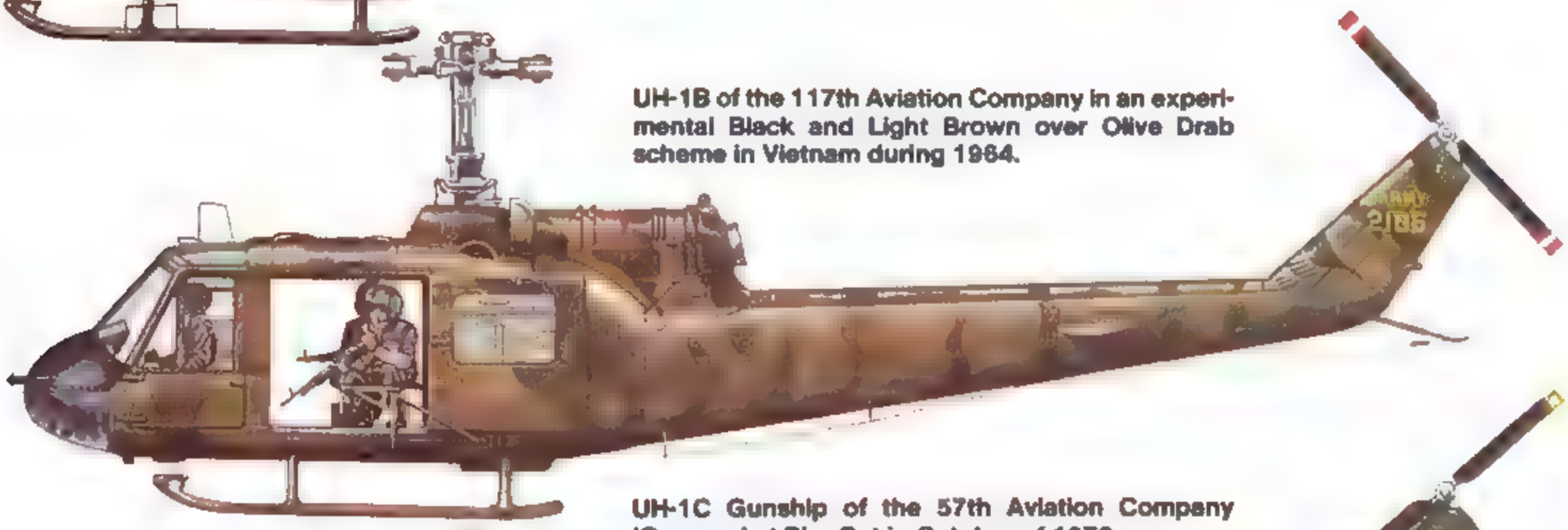
(Right) Hueys were responsible for saving thousands of lives during the Vietnam war. This UH-1H of the 571st Medical Detachment uses its hoist to lower a patient to a hospital ship off the coast of Vietnam. (Bell)

(Below) Proof of the resourcefulness in applying the Huey to diverse tasks — this UH-1H of the 101st Airborne Division carries two scout motorcycles during REFORGER 76 in Germany. (US Army)

HU-1A of the 57th Medical Detachment in Vietnam during 1962. One of the earliest units into the war zone, the 57th pioneered the 'Dust-off' mission.

One of the first production UH-1B Hueys was assigned to SHAPE in Germany during 1960.

UH-1B of the 117th Aviation Company in an experimental Black and Light Brown over Olive Drab scheme in Vietnam during 1964.



UH-1C Gunship of the 57th Aviation Company 'Cougars' at Phu Cat in October of 1970.

HOGHEAD II, a UH-1C gunship of the 'Cobra' gunship platoon of the 114th Assault Helicopter Company. This Huey was known as 'Cobra Lead'.

UH-1C of the 227th AHB, 1st Cavalry Division, Delta Company at Bong Son AO in 1967.

A heavily armed UH-1D of the Royal Australian Air Force. Both the South Vietnamese and the Australians used heavily armed UH-1Ds.

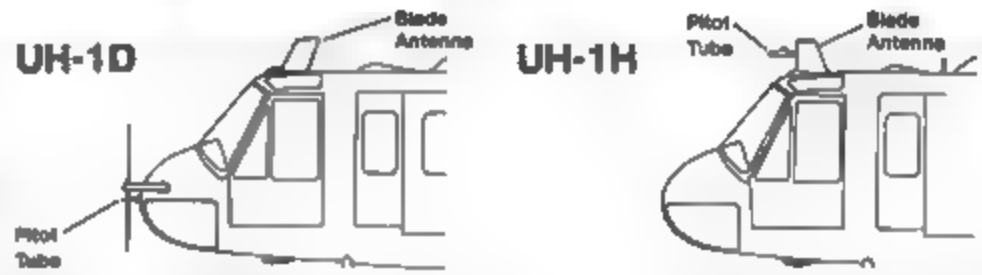
A twin engined UH-1N of the USAF's 20th Special Operations Squadron at Hurlburt Field, Fl in 1982.

An early Marine Corps UH-1E at DaNang in May of 1966.

This JUH-1 SOTAS was one of four UH-1H Hueys modified to test the Stand Off Target Acquisition System with the addition of a rotating AN/APS 94 radar boom mounted on the belly of the aircraft.

(Above) The disastrous results of accidentally flying over a demolition area in Vietnam are seen in the wreckage of this UH-1H of the 71st AHC in 1969 — the blades and tail boom were blown off the aircraft. (Dave Grieger)

(Below) A UH-1H of the 101st Airborne (Air Assault) Division lifts a half-ton truck platform during 'Reforger 76'. (US Army)



(Below) The UH-1C built for Canada was initially designated the CUH-118 but was later redesignated CH-118. This CH-118 is overall Yellow with Red and White trim, and Black and Red lettering. (Patrick Martin via Terry Love)

(Above) This United Nations UH-1H was pressed into service to transport civilian observers over the many trouble spots in the middle east. (Bell)

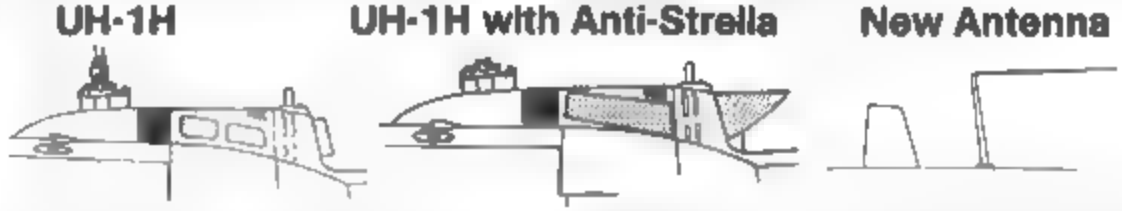
(Above) This UH-1H (660746) of the US Readiness Command carries a Light Tan, Red Brown, Dark Green, and Black camouflage scheme during 1977. The camouflage has been extended onto the skids. (Hugh Muir via Terry Love)

(Below) A line up of UH-1Hs of the Royal Thai Air Force. (Bell)

(Above) UH-1H Medivac in Vietnam is painted in the new white scheme to avert enemy fire. It did little good except to provide the NVA and VC with a better target. (Author)

(Below) This Yellow-Striped 'Dustoff' UH-1H of the 2nd Medical Battalion evacuates a casualty during operation 'TEAM SPIRIT 84' held in Korea during March of 1984. This Huey exhibits some of the alterations made to update Hueys retained by the Army, which include a modern antennae arrangement and anti-Strella modifications. (US Army)

(Above) A Bell 205A belonging to the CIA airline AIR AMERICA over South Vietnam in July of 1969. The identification letters carried on the Huey were insignificant since most CIA aircraft used during the war were assigned such numbers at random; and often more than one aircraft carried the same registration, making it virtually impossible to locate the exact position of all Air America aircraft at one time. The tripod device above the co-pilot's door is a High Frequency antenna for communication with ground units. (US Air Force)



Crash-Rescue Huey

HH-1D

During the Spring of 1968, the Army successfully evaluated the Huey as a Heliborne Fire Suppression System for crash-rescue. A number of UH-1Ds were fitted with two twenty-five gallon 'light water' tanks mounted internally in the aft cargo wells, which fed a pilot-controlled boom with a spray nozzle, mounted on the forward right cabin section. The boom had an azimuth from 0° to 90° and could be extended from 9 to 16 feet. The chemical was fed into the boom by means of bleed air from the engine compressor section. Optional equipment included an internal rescue hoist and three litters. Later models had larger tanks mounted externally below the cargo doors allowing more room in the cargo area for crew and additional fire-rescue tools. At the crash site, the Huey hovered, allowing firefighters to rappel to the ground while, simultaneously, the pilot laid a 15 to 40 foot wide water path to the burning aircraft. Protected by this water curtain, rescuers could reach the wreckage to rescue injured, who could then be loaded on the Huey and treated by an onboard medic while enroute to hospital.

HH-1H Crash-Rescue Huey

On 4 November 1970 the Air Force submitted a contract for thirty HH-1H Crash-Rescue Hueys for local base rescue to replace the venerable HH-43 Huskie. Deliveries began in October of 1971 and were completed in 1973. Based on the UH-1H, these rescue Hueys are distinguished by their roof-mounted hoist which was capable of lifting a 600 pound load on a 250 foot cable. The HH-1H is also equipped with all-weather instrumentation which is mounted in a radome on the aft fuselage belly. A few early models had the tail rotor mounted on the left side, however, these were later repositioned to the right as were those on later production models.

(Above) Fire fighters enter a mock crash area while a US Army HH-1D Crash/Rescue Huey creates a passageway with a 'light water' solution. In the cargo area can be seen the light water container and rescue hoist. Pope AFB, NC in January of 1972. (US Army)

(Below) An HH-1H of the USAF 301st ARRS conducts overwater training at Homestead AFB, FL in June of 1975. Purchased as the replacement for the HH-43 Huskie, these rescue Hueys were originally finished in Light Gray, with White roofs, and Yellow and Black trim. (US Air Force)

(Below) This HH-1H has its rescue hoist in the deployed position and carries a weather radome on its aft belly. The US National Insignia is painted on the lower surfaces along with RESCUE which is painted in Black. (US Air Force)

UH-1N Twin Engined Huey

Initially designated the Bell Model 208, the Model 212 'Twin' was the result of Bell's desire to give the Huey more power plus the safety feature of two engines. On 1 May 1968 Canada approved the development of a twin engined UH-1 with the stipulation that power be supplied by a PT6T-3 Turbo Twin Pac built by Pratt & Whitney Aircraft of Canada — the military designation being T400. The Canadian government ordered fifty of these aircraft under the initial designation CUH-1N, later designating it the CH-135. Simultaneously, orders were received from the US military — seventy-nine for the Air Force, Forty for the Navy, and twenty-four for the Marine Corps, all under the designation UH-1N. The Twin made its first flight in April of 1969 with USAF deliveries beginning in October of 1970 — Canadian deliveries began ■ May 1971 with those to the USN and USMC following shortly. From 1973 to 1976 the Navy and Marines took possession of an additional 159 UH-1N models.

The twin engines produce 1,800 shp, driving a 48 foot 'thin tip' rotor with an increased cord of 3 inches. One engine operating can continuously deliver 800 hp. As an increased anti-torque measure, twin Hueys have the tail rotor mounted on the right side of the tail fin. The twin engine UH-1N Huey is easily differentiated from their single engined predecessor by the redesigned engine cowl which incorporates twin intakes, twin exhausts, and a wider, flatter profile. Another distinguishing feature is the streamlined nose with smaller chin windows. The UH-1N can carry fourteen passengers plus the pilot. Gross weight of the all aluminum aircraft is 12,000 pounds. A 215 gallon fuel capacity permits a range of nearly 300 miles. A noteworthy achievement occurred during 1973 when the twin Huey received full IFR certification. The IFR rating required the installation of improved electronics, a new instrument panel, and stabilizer controls.

The Air Force uses its twin engined Hueys for pilot training, rescue, recovery, missile site support, VIP transport, and counter-insurgency (COIN) operations. A later modification to Air Force UH-1N model was the installation of two forty-five gallon fuel tanks just forward of the tailboom allowing an extra hour of flight. Marine Corps twin Hueys spend much of their operational time at sea as part of Marine deployment around the world.

Bell Twin 212

Having the safety feature of a second engine, Bell anticipated that the twin Huey would become popular on the civil market. It did and the commercial version, called the 'Twin 212', went into full scale production during the Fall of 1970. The twin has dual hydraulic systems and dual AC power systems. Operational equipment includes an internal rescue hoist, inflatable nylon flotation gear, and high skid gear.

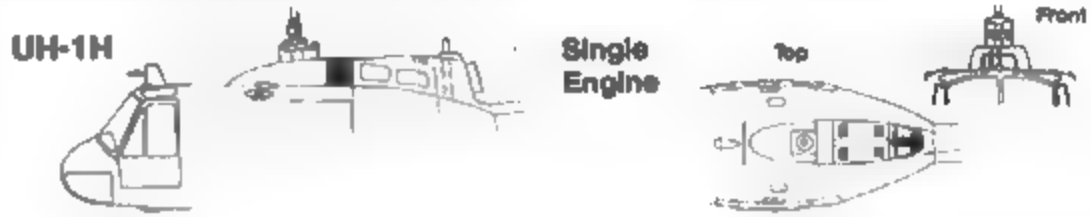
VH-1N

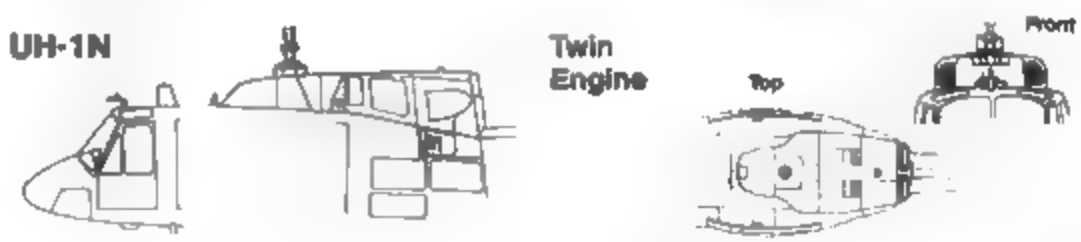
Marine Corps UH-1Ns twins were converted to VH-1Ns as staff transports, and six twins were converted as Presidential staff transports. Among the special features on these Hueys are plush interiors, boarding steps, and highly polished exterior surfaces. A number of USAF VH-1Ns serve as VIP transports with the 1st Helicopter Squadron at Andrews AFB.

HH-1N

Similar to the HH-1H Crash-Rescue Huey, the Air Force pressed twenty-two twin engine Hueys into service for rescue work, many with the Air Force Reserve. A follow-on order in 1970 added another thirty HH-1Ns. Ten aircraft were assigned to the 20th Special Operations Squadron (SOS) at Hurlburt Field for support of COIN operations and anti-terrorist missions. Painted in unusual 'tri-tone' mottled camouflage patterns, these aircraft are fitted with the tools of anti-guerrilla warfare which include advanced electronics, insertion-extraction apparatus, armor plating, psywar loudspeakers, and heavy weapons systems. Also fitted are internal rescue hoists and electronics similar to that carried on the HH-1H. The HH-1H is being phased out in favor of the HH-60 Blackhawk.

(Above) One of two UH-1Ns used by the USAF 475th Air Base Wing at Yokota AB, Japan in 1979/80. These twin engined Hueys were finished in Light Gray with White Roofs and Red, White, and Blue trim. (US Air Force)



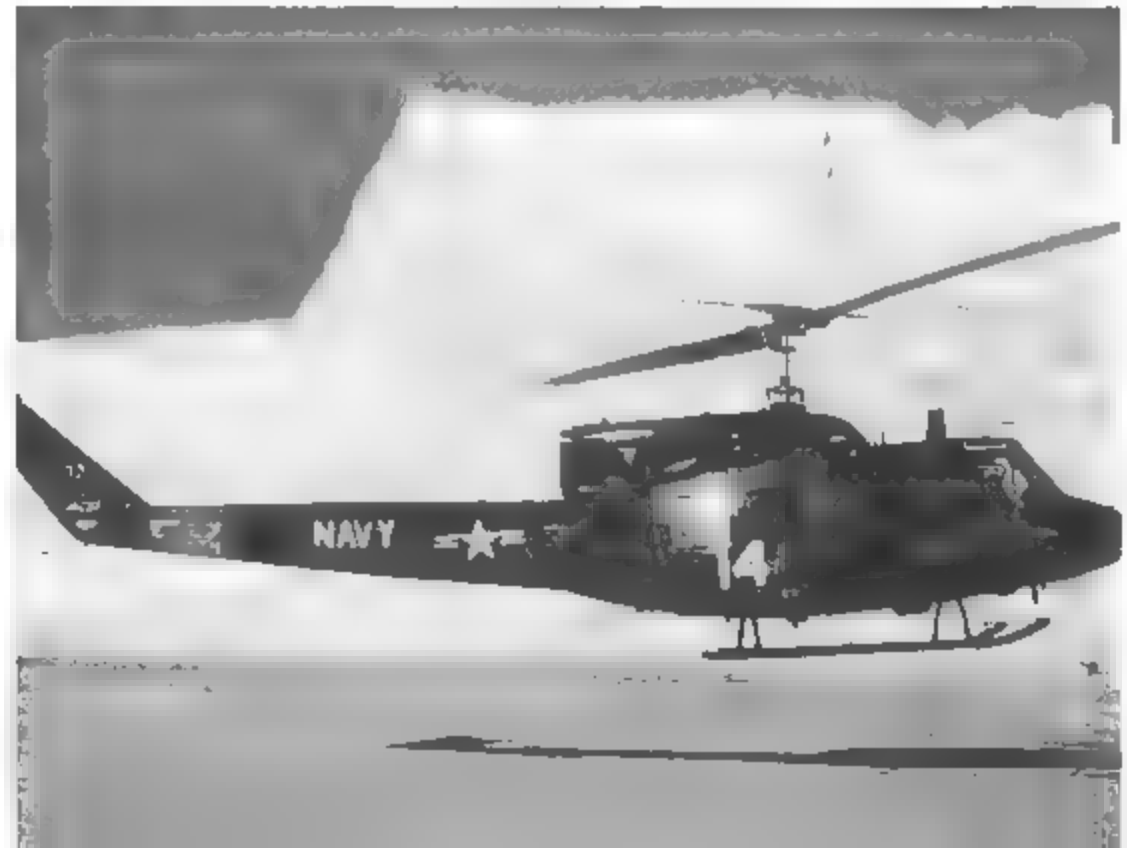


(Below) One of five UH-1Ns used by the USAF's obscure 20th Special Operations Squadron (SOS) at Hurlburt Field, FL. The non-standard camouflage of Light Green, Dark Green, and Light Brown segmented by Light Gray continues onto the skids. Like their ancestors of the Vietnam war, these Hueys bear a minimum of markings and carry the same 'Green Hornet' emblem on the tail boom. Early 1982. (Mike Campbell)

(Above) UH-1Ns of the 57th TTW carried high visibility Red and White paint schemes in 1984. A Yellow and Black checkered band was displayed on the tail fin along with a TAC emblem. (Terry Love)

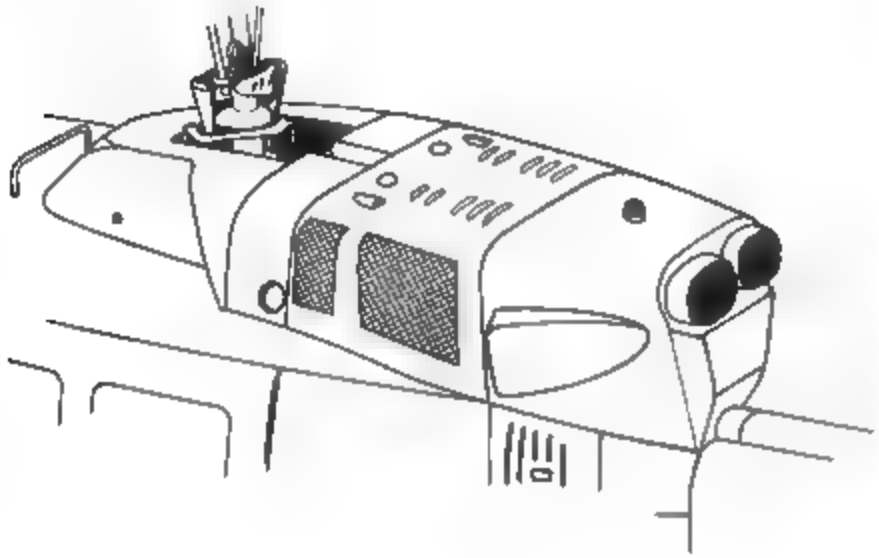
(Left) The internal rescue hoist can be installed in one of four positions in the cargo area, as seen on this USAF HH-1N with the boom swung into the aircraft. Tucked behind the pilot's seat is a jungle penetrater used as an option with the hoist. (Pete Harlem)

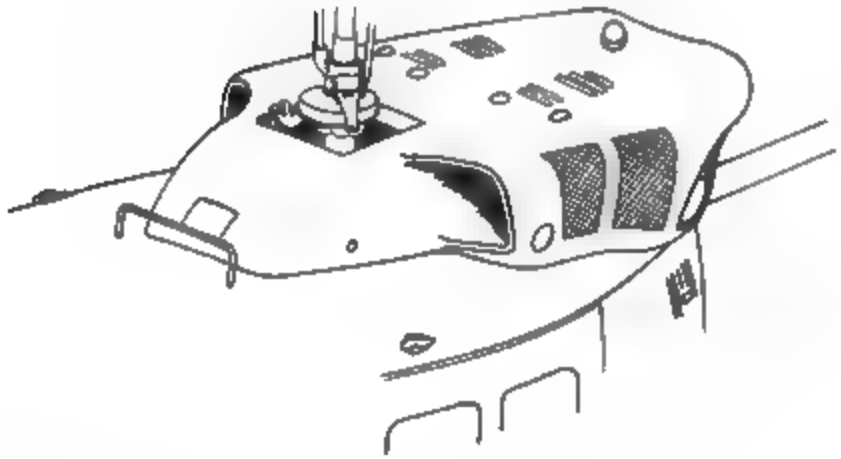
(Below) UH-1N, aircraft number 14 of VXE-6 (Antarctic Development Squadron) hovers at the Dry Valley Drill Site in December of 1975. The entire ship is painted International Orange in keeping with the policy of high visibility for Navy aircraft operating in arctic regions. (US Navy)



(Right) A Dark Blue UH-1N departs from LPH-7 (Amphibious Assault Ship) USS GUADALCANAL during exercise 'Northern Wedding 78' in the Atlantic Ocean. (US Navy)

UH-1N Twin





(Right) This Twin 212 was used by Bell to test the twin Huey concept. The engine cowling was redesigned on production models having side intakes added near the reshaped exhaust fairing. (Bell)

UH-1F

On 7 June 1963 the U.S. Air Force named Bell the winner of its competition held to select an 'off-the-shelf' helicopter for missile site support. Built specifically for the Air Force, the UH-1F was based on the short bodied Model 204 and was a continuation of the UH-1B series initially known as the H-48 in the USAF designation system.

Since the Air Force had an abundance of General Electric T58-GE-3 engines in stock (the same engine used in the HH-3), they directed Bell to build the Huey airframe to accept the General Electric T58 engine. The T58 had to be mounted backwards since its driveshaft ran aft to the transmission necessitating engineering efforts to route intake and exhaust duct work around the engine. The Lycoming exhaust area was faired over and the T58 tailpipe ended up on the starboard side. This distinctive T58-GE arrangement was not as efficient as the Lycoming engine arrangement, but it did use up existing stocks of GE engines. Initial production models featured the early style bell mouth intake. The T58-GE-3 produced 1,325 shp for a max speed of 120 mph and a range of 347 miles. Fuel capacity was 245 gallons and gross weight was 9,000 pounds. The 48 foot rotor with a 21 inch chord was the same rotor carried on the UH-1D. For rotor clearance the D model tailboom was used, which had a two-bay baggage compartment built into the starboard side below the exhaust. This brought the overall length up to 41 feet 5 inches. The F could carry ten passengers plus the pilot.

119 examples of the UH-1F were built with the first model being flown on 20 February 1964. Deliveries began in September current of the same year with the first aircraft assigned to the 4486th Test Squadron — deliveries were completed during 1967.

While purchased for missile site support, the Air Force also used the UH-1F Huey for staff transport, cargo delivery, security, and rescue. A number of UH-1Fs served with the 606th Air Commando squadron in Thailand during the early 1960s. Hueys from this unit were later used to form the 20th Special Operations Squadron (20th SOS) known as the 'Green Hornets' which relocated to Vietnam in 1966. 20th SOS UH-1Fs served as transports for highly classified Special Operations Group (SOG) teams which conducted 'cross-border' operations. These Hueys were fitted with armored seats, rope ladders or hoists, and M60 machine guns suspended from cords in the cargo doorways. All 20th SOS Hueys were painted in the 'Tri-tone' camouflage scheme peculiar to USAF aircraft during this period. Green Hornet UH-1F Hueys had the later style screened particle separator units retrofitted to the engine intakes. Many of these Hueys were later observed having two UHF/VHF blade type antennas mounted on the cabin roof, one behind the other. When replaced by UH-1Ns, many UH-1Fs were used for range support duties or found their way onto the inventories of fire fighting agencies.

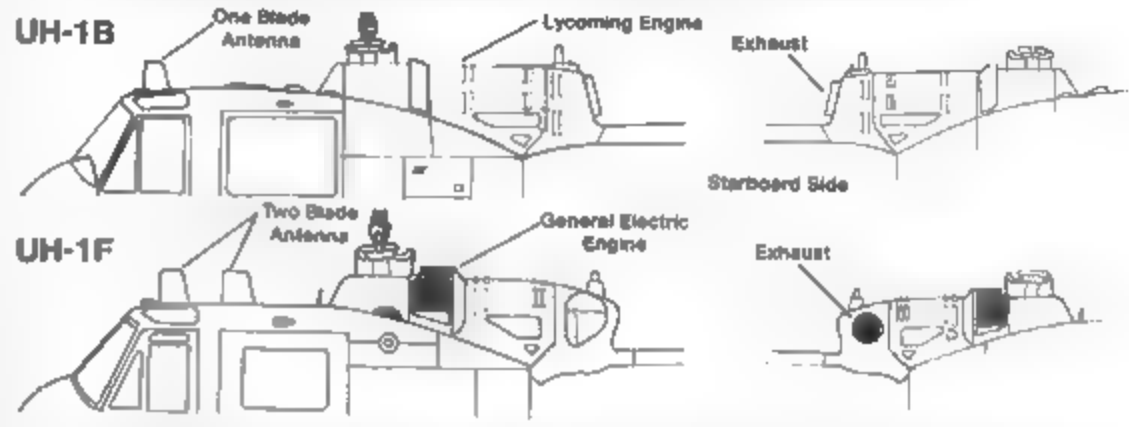
UH-1P Gunships

The UH-1F served the 20th SOS as a 'slick' or troop carrier — and when heavily armed, it was designated the UH-1P. Most sources state that the UH-1P was used for 'psywar' missions in Southeast Asia because government released versions of 20th SOS activities say so. However, the UH-1P was, in fact, a gunship armed with pintle-mounted miniguns and rocket pods on the hard points. Twenty UH-1Fs were converted to UH-1P Gunships with most of them being assigned to the Green Hornets. This model was unique to the 20th SOS, with 'F' and 'P' designations often being used interchangeably within the unit.

TH-1F Trainer

The UH-1F was built as a follow-on to the Air Force's UH-1F, and was often used as a trainer, including hoist training. Bell received an Air Force contract for twenty-seven TH-1Fs in May of 1966. The first example was flown in January of 1967 with deliveries being made from April to July of 1967.

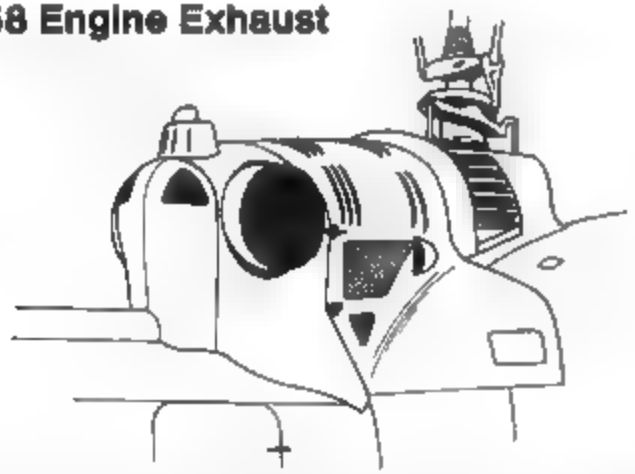
(Above) Officially called the H-48 in the USAF designation system, this was the first of 119 UH-1Fs delivered to the Air Force. Overstocked GE T58 engines were mated with the short-bodied airframe resulting in an unusual exhaust configuration. (US Air Force)



(Below) When the General electric T-58 engine replaced the Lycoming engine the exhaust was re-routed out the starboard side of the Airforce UH-1F variants. For rotary clearance the D model tail boom was used that had a two bay baggage compartment built into the starboard side. The Green Hornet emblem was found only on 20th SOS UH-1F and P Hueys. (Bob Chenoweth)

(Above) A TH-1F trainer of the 37th ARRS at Ellsworth AFB during SAC exercise 'Global Shield 79'. (US Air Force)

T-58 Engine Exhaust



(Right) When armed the UH-1F became the UH-1P, unique to the USAF 20th SOS Green Hornets. 20th SOS Hueys supported highly classified 'cross-border' operations in Southeast Asia and comprised the only combat helicopter squadron in the history of the Air Force. This UH-1P has been fitted with an XM-93 minigun and rocket pod. Downward visibility through the 'chin bubbles' was sacrificed for the addition of armor plates installed for added crew protection.(via author)

UH-1E Marine Corps Huey

In March of 1962 Bell won an industry wide competition to build a Marine assault support helicopter. On 6 January 1963 Bell received the production contract from the Marine Corps and had the first two UH-1Es in the air on October 7th the same year. The first UH-1E delivered to an operational Marine unit went to Marine Air Group-26 on 21 February 1964. UH-1E production ended during that year after a total of 192 aircraft were built. As a result of major changes made during the production run, the UH-1E was built in two distinctly separate versions.

The first batch of thirty-four UH-1Es produced were basically a USMC version of the UH-1B powered by an 1,100 shp T-53-L-11 engine with a max cruising speed of 120 knots. Installation of the B model rotor system gave the UH-1E a takeoff weight of 6,600 pounds and the UH-1B fuel system provided a 165 gallon fuel capacity.

After thirty-four (UH-1B based) Marine UH-1E machines were built the Bell production line changed over to UH-1C production which was used as the basis for the balance of the Marine Corps UH-1Es with the 540 rotor system which increased takeoff weight to 8,500 pounds and boosted maximum cruising speed to 128 knots. The Charlie model fuel system increased capacity to 242 gallons. The UH-1C tailboom was also installed as standard equipment, but many of the initial production models were retrofitted with the 540 rotor system. The Marines had specified that their Hueys be of all-aluminum construction owing to their almost constant use near water. Some performance was sacrificed since aluminum was somewhat heavier than the highly corrosive magnesium normally used. Also unique to Marine Hueys were additional avionics, a rotor brake, and a roof mounted rescue hoist. Some UH-1Es were retrofitted with the T-53-L-13 engine and a small number had the older type bell mouth air intake replaced with the improved screened particle separator system. ■ Vietnam UH-1Es were used as both slicks and gunships by the Marines, the latter mounting 7.62MM machine guns and rocket pods on the hard points. Some gunships had their cargo hooks and rescue hoists removed and all flew without cargo doors. All Vietnam-based Marine Hueys featured armored seats and M60 door guns on swivel-type mounts. Beginning in 1967, many UH-1Es were fitted with a TAT 101 twin 7.62 machine gun chin turret. More than half of the ■ models built still serve in the Marine Corps, with 126 being carried on inventory which are deployed in two UH-1E squadrons of the Marine Air Reserve and six utility squadrons which have a mixture of UH-1Es and UH-1Ns.

TH-1E Trainer

Based on the later UH-1C, the TH-1E was a crew training variant. Twenty examples were built during 1965.

(Above) B model characteristics identify this UH-1E as one of the initial production batch examples. This 'Echo' Huey of HMX-1 (Helicopter Development Squadron) at Quantico carries an unusual mixture of weapons, an XM-6 and XM-18 encased minigun, which was briefly tested on the UH-1B and was used operationally for a short time on the AH-1G Cobra. A USMC emblem is attached to the door post. (Bell)

(Right Center) An early UH-1E of VMO-6 at Camp Pendelton ■ August of 1964. FM antennas on eight inch standoffs, mounted on the upper and lower tail boom, were standard equipment on UH-1Es. (US Marine Corps)

(Right) An early UH-1E at DaNang in May of 1966. While Marine UH-1Es were built in two distinctly different versions with some of each being configured as gunships, the designation was unchanged. In Vietnam, USMC VMO (Marine Observation Squadron) Hueys were identified by unit numbers carried on their sliding cabin doors; however, since gunships normally flew without doors, it was nearly impossible to match aircraft with units. The standard M60s are mounted on makeshift 'swing-out' apparatus. (US Marine Corps)

UH-1L Navy Huey

Shortly after the Marines received their UH-1Es, the Navy tested a few and decided to purchase their own Hueys. Under the designation UH-1L, a limited production Navy variant was produced with only eight examples being built. Intended for use in the utility role, the UH-1L model was ordered on 16 May 1968, and was essentially a modified UH-1E (the later version with the 540 rotor system) minus armor and armament, and powered by the L-13 engine. All eight aircraft had roof mounted rescue hoists and later style screened air intakes. Immediately upon delivery in November of 1969, painted Engine Gray, the first four UH-1Ls were sent to Vietnam where they formed the Sealords Detachment to augment HAL-3. The Sealords' mission quickly expanded to include combat support and eventually they were adapted to carry weapons systems. The UH-1Ls, including the four sent to Vietnam in January of 1970, were fitted with mounts capable of carrying a 500 pound bomb or 500 pound Fuel-Air Explosive (FAE).

TH-1L

Nearly identical to the UH-1L, but used exclusively as a trainer, the TH-1L was the first Navy owned operational Huey. Forty-five examples of the UH-1L were ordered concurrently with TH-1Ls in May of 1968 with deliveries beginning in November of 1969. Unlike the UH-1L variant, TH-1Ls were built from the beginning with the bell mouth intake. Delivered in factory-applied White-Orange paint schemes. This version replaced the older Navy Sikorsky H-34 Seahorse, and UH-1D Hueys borrowed from the Army.

(Above) The first of the eight UH-1Ls built flies over Texas. This Huey exhibits the 'C' model characteristics which include a cambered tail fin, asymmetrical elevators, screened air intake section, and fuel filler on the port side. This aircraft was destroyed in a crash at Binh Thuy, Vietnam in late 1970. (Bell)

(Below) TH-1L of HT-8 over Florida in March of 1971. Colors are overall White with Red Orange trim, and a Black upper nose with a White 41. (US Navy)

HH-1K

In December 1968 the Navy awarded Bell a contract for twenty-seven HH-1Ks with deliveries beginning in May of 1970. Based on the UH-1E the HH-1K had improved avionics and was built as a search and rescue aircraft. The 1,400 SHP L-13 engine was installed as standard equipment. In November of 1970 three aircraft were sent to Vietnam to augment HAL-3.

HUEY TUG

The little known 'Huey Tug' was a concept demonstrator developed by Bell. During the summer of 1969 the US Navy conducted a sea evaluation to determine the suitability of using the Huey to resupply ships at sea. While successful in transporting loads of more than 5,000 pounds off a ship's deck, the 'Tug' never went into production. This Huey variant utilized a UH-1B airframe with principal changes including the installation of a 540 rotor system, larger tail rotor, strengthened airframe, and electronic stability control systems. Other features included a remote control mirror (to observe sling loads) and a cargo hook load tension meter. This configuration was also considered by the Army.

(Above) This Marine HH-1K at El Toro in 1978 is overall White with a Yellow tail band. (Hugh Muir via Terry Love)

(Below) HH-1K in non-standard colors of Dark Blue and Orange. Tail rotor blades are Black with Yellow and White stripes. (Hugh Muir via Terry Love)

Electronic Huey

EH-1H

Some of the most interesting Huey variants were those modified by the Army as Special Electronic Mission Aircraft (SEMA) under sponsorship of the Army Security Agency. Code named QUICK FIX, these Hueys provided ground commanders with a tremendous force multiplier since this Army helicopter electronic warfare system could monitor, exploit, and neutralize enemy communications. Beginning in 1976, QUICK FIX was developed in two phases utilizing highly modified 1969 vintage UH-1Hs for intercept and jamming. The Phase One configuration was known as QUICK FIX 1A which later became 1B with the change to updated jamming gear. Operational testing was not completed until 1982. In October of the following year, the first three EH-1Hs were fielded to the 313th Military Intelligence Battalion (MIB) of the 82nd Airborne Division with twelve aircraft scheduled for deployment to MIBs in 1982. Modifications were made at the Corpus Christi Army Depot which resulted in the cargo area being completely filled with electronic mission gear for two operator positions. Externally, the aircraft bristled with antennas, two of which are located on the cabin belly and aft ventral tailboom which due to their length had to be retracted for landing. Installed by field units at the lower rear corner of both cabin door openings were XM-130 chaff dispensers as a measure against radar guided and infrared seeking missiles. The right unit is used as a flare dispenser.

EH-1X

The EH-1X Huey, developed for Phase Two of QUICK FIX, known as QUICK FIX IIA, differed from the earlier EH-1H system in that it also incorporated a Direction Finding (DF) capability. The major noticeable difference in the two Huey types are the four dipole antennas affixed to the EH-1X tailboom and only one electronic operator position. In December of 1977 the Department of the Army directed that only ten such systems be built. The first EH-1X was completed during the Fall of 1976 under contract to ESL Inc. The follow-on to the Huey QUICK FIX systems is the EH-60A Blackhawk (QUICK FIX IIB) which has increased space and weight capability allowing two operators to share the DF and jamming workload.

UH-1V

This is an unofficial designation given to UH-1Hs modified by the US Army Electronics Command at Lakehurst, NJ for 'medevac' work. Updated mission gear includes a radio altimeter, DME, glide slope indicator, and a rescue hoist. The first unit to receive the UH-1V was the 397th Aeromedical Detachment of the New Hampshire ANG.

JUH-1 SOTAS

Under the designation JUH-1 at least four UH-1H models were converted as advanced developmental research models to demonstrate the operational feasibility of using the Stand Off Target Acquisition System (SOTAS) in Europe. The Army began testing the system ■ 1974 with operational use beginning the following year in Korea along the DMZ, and later two JUH-1s were deployed to Germany the same year. By 1979 four units had been assigned to Germany as divisional assets and the system was then destined for use ■ the EH-60 Blackhawk. Most unusual was the installation of an extended skid which retracted ■ flight permitting full rotation of the large antenna pod on the cabin belly. Contained in the pod was a Moving Target Indicator (MTI) which provided radar coverage by detecting movement beyond ground line-of-sight. An operator monitored an information gathering console mounted in the cargo area. JUH-1 variants also featured new autopilots and navigational systems. The Huey SOTAS program is now defunct having been replaced by the EH-60 Blackhawk system.

(Above) The high skid gear on the JUH-1 Stand-off Target Acquisitions System (SOTAS) retracted to allow rotation of the AN/APS 94 radar boom which had a frowning face painted in yellow on the opposite end. Though configured as an 'H' model, this Huey retains the pitot tube on the nose. Note the boarding step block over the starboard skid. Number 448 is seen in Korea during May 1976. (US Army)

(Below) The skid is retracted and the SOTAS gear has been rotated into an operational position. (Bell)

Huey Armament

The origin of armed helicopters had its beginning in World War II when the idea was first proposed. Various attempts were made to arm helicopters during the Korean war. Initially, the Army's interest in arming helicopters was limited to the development of a flying tank destroyer. By mid 1955 a variety of mostly fixed wing aircraft had been tested with a mixture of small arms, rockets, and chemical munitions. Helicopters were briefly evaluated but rated as poor performers. Undaunted by these results, the Army conducted further tests with the belief that aerial fighting vehicles were a necessity to provide close support for airlifted troops. Without formal approval as a research and development project, the Army Aviation School cautiously waded into the business of rewriting airmobility doctrine to include the use of armed helicopters. The first live fire tests were carried out in early July of 1956 using two .50 caliber machineguns and four Oerlikon 8cm rockets mounted on a Bell H-13 helicopter which was anchored to an elevated wooden platform. Experiments continued into 1957 and led to the formation of an Aerial Combat Company using a wide variety of weaponry mounted on four different types of helicopters — the Huey was not among them.

The first formal program for the development of helicopter armament began in March of 1957 when the Army began development of a single machine gun kit for installation in three helicopter types and a four machine gun kit for the YH-40 pre-production Huey. This formal development program was strongly opposed by the Air Force who saw the development of an Army attack helicopter as an infringement on their close air support mission (during the Vietnam war, the Air Force finally began arming a few of its own helicopters for defensive and limited offensive purposes). The Army, in a desire to avoid aggravating the Air Force, maintained that such armament would be for defense only. The Sikorsky CH-34 Choctaw served as the primary test platform for weapons systems prior to the Huey's entry into the program. Since Army interest centered around arming helicopters for anti-tank work in 1958, tests were ordered in August with the SS-10 wire-guided missile developed by the French. Tests of suppressive fire systems continued and eventually led to several practical weapons systems. By 1960 armament as standard equipment on Army helicopters had gained official approval and in 1961, SS-11 missile kits were ordered for HU-1B Hueys. Other systems first used on Hueys, beginning in 1962, comprised 2.75 inch rockets and the XM-153 7.62 quad machine gun. This development of 'mechanical muscle' for helicopters completely changed the makeup of Army aviation. Until the success with armed helicopters occurred, Army aviation had been limited to the observation role. The arming of Helicopters placed the Army in a dominant position in tactical aviation with Vietnam serving as the ultimate proving ground for the plethora of weaponry used to bolster the airmobile concept. Initially, lift helicopters were escorted by B-26 Invaders and T-28 Trojans, however they could not place their ordnance near friendly troops like the slower, more maneuverable helicopter gunships. Early attempts, although futile, were made to arm the slow CH-21 Shawnee troop transports in order to provide suppressive fire during assaults. These problems were overcome with the deployment of UTTCO UH-1A Hueys which ran interference for the CH-21s. Armed with locally fabricated skid mounted XM-37 .30 caliber machine guns and sixteen 2.75 inch Mighty Mouse rockets obtained from the Air Force, these Hueys were replaced by UH-1Bs sporting factory-installed systems of four 7.62 machine guns and field developed units of eight 2.75 inch rockets.

These weapons systems evolved into a myriad of configurations and combinations. The Navy began arming the Hueys used by HAL-3 in Vietnam. From 1966 to 1972 the Seawolves tested a wide variety of armament. Two door gunners augmented these systems and became standard on all combat Hueys including UH-1D and UH-1H models, which were called 'Slicks', since they were devoid of heavy armament. As the war progressed, many 'Slicks' were adorned with an array of weapons. The major deficiency found in arming helicopters was their greatly reduced speed and maneuverability as a result of the weight of these heavy weapons — compounding this weight problem was the addition of armored seats for the pilots. Many of these shortcomings were corrected with the introduction of the much improved UH-1C Huey Gunship which served as the interim armed helicopter. UH-1Cs were built as Huey gunships capable of carrying a full range of weapons systems without sacrificing performance.

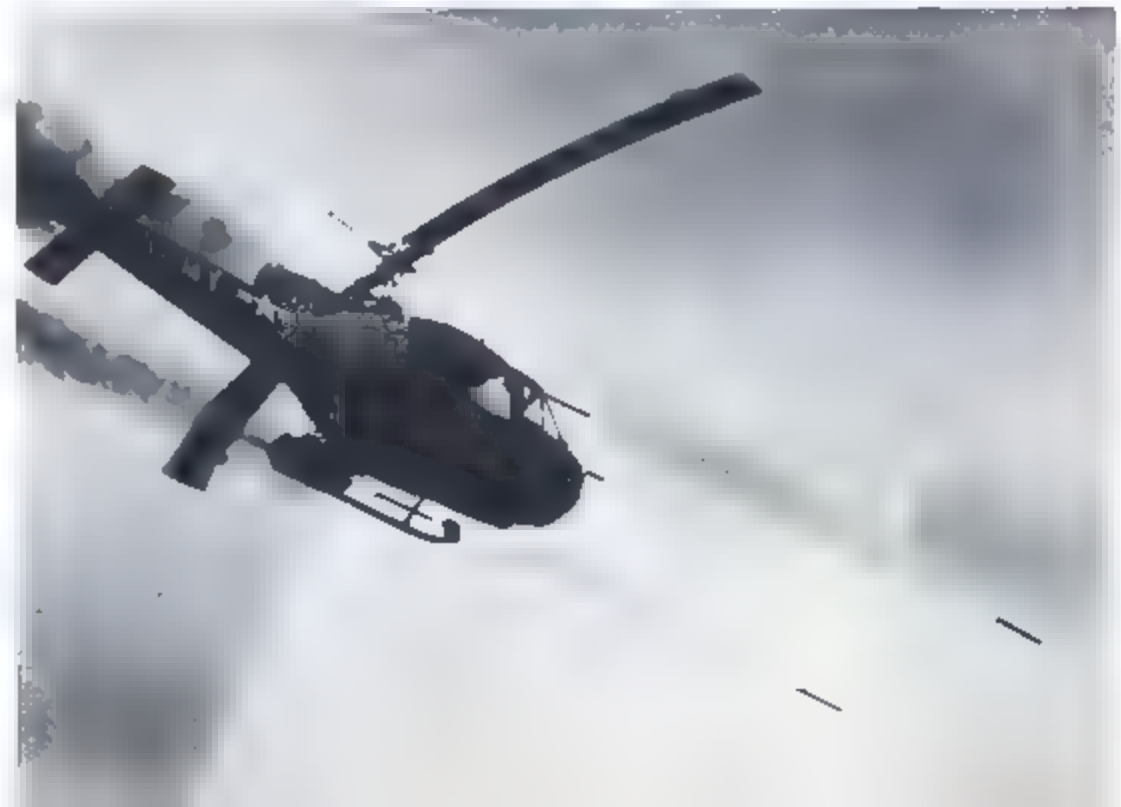
The following are the major test and operational systems used on Hueys — many others were tested, but on a very limited basis.

XM-3 (2.75 Inch Rocket Launcher)

This subsystem was the result of one of the Army's first funded programs for research and development to test the feasibility of armed helicopters. Development began in November of 1960 and two years later, a less complex version was designed. This forty-eight shot rocket system was secured to a specially designed crank and adapter assembly. The 2.75 inch Folding Fin Aerial Rocket (FFAR) was determined to be the best available for the XM-3. A MK VIII Infinity reflex sight was located on the pilots instrument panel. The XM-3 was put into limited production and was in use in Vietnam by May of 1963.

(Below) An early two-cell version of the XM-3 rocket launcher being loaded for tests at Ft. Campbell, KY during March of 1963. Visible inside the makeshift mount is the barrel of a .30 caliber machine gun. (US Army)

(Below) This UH-1B, carrying an XM-3 2.75 inch rocket launcher system, was known as 'Big Bertha' while assigned to the 118th Aviation Company in Vietnam during 1963. (Elof Lundh)



XM-5 (M-75 Grenade Launcher Turret)

Also known as a 'Thumper' or 'Chunker', the XM-5 was developed by The Springfield Armory in 1962 to provide a large caliber weapon with a high rate of fire. The prime contractor was General Electric which began deliveries in 1966. It consisted of an M-75 40MM grenade launcher fed by linked ammunition pulled through a flex chute from a storage container in the hook hole. Initially, the system held 150 rounds — sixty-five in the chute and eighty-five in an ammunition box. A later version held 302 rounds in a rotary drum. The XM-5 could fire 220 to 240 shots per minute (spm) at a maximum range of 1,500 meters. A special swing-down sight was mounted above the left seat. The turret of the 500 pound system could traverse 80° left and right and the barrel could elevate ¢15° and depress -35°.

(Right)The swing-down reflex sight for the XM-5 grenade launcher system mounted on a UH-1B at the Springfield Armory in 1962.

(Below) The potent XM-5 'Thumper' grenade launcher provided a large caliber weapon with a high rate of fire mounted on a UH-1B. The three support braces for the launcher can be seen inside the chin bubble. (US Army)

XM-6 (Quad Machine Gun System)

Initially designated the XM-153 quad gun system with the M-73 machine gun, this system became the XM-6 incorporating the M60C machine gun manufactured by the Emerson Electric Company beginning in 1963. Mounted primarily on UH-1Bs, its four 7.62 machine guns capable of firing 550 to 650 spm at a range of 1,000 meters. Mounted on either side of the Huey, these units were belt fed through flex chutes from ammunition trays stored on the cabin floor which held a total of 6,000 rounds. On early Hueys this system was normally mated with rocket pods or racks of USAF air-to-air 'Mighty Mouse' rockets.

XM-16 (Quad Machine Gun System)

This was essentially an XM-6 Quad Machine Gun system integrated with the XM-156 multi-armament mount allowing an MA4A bomb rack to be carried. Rocket pods were secured to these racks and an XM-60 reflex sight was mounted above the starboard pilot's seat. Development began in May of 1963 with the prototype being delivered in February of 1964. Variations of the XM-16 were developed by the UTTCO in Vietnam. When used on the UH-1D or H, this system was mounted on the forward hard points.

(Below) XM-6 quad machine gun unit incorporated an XM-157 rocket pod. The streamlined nose cone did little to reduce drag and was carried more as a novelty which crews blasted off during rocket firing. Mounted just forward of this system, seen on a UH-1B of the 117th Aviation Company, a standard infantry type M60 attached to a swivel Sagami mount. Vietnam 1965 (Cary Shelton)

XM-18 (Mini-gun Pods)

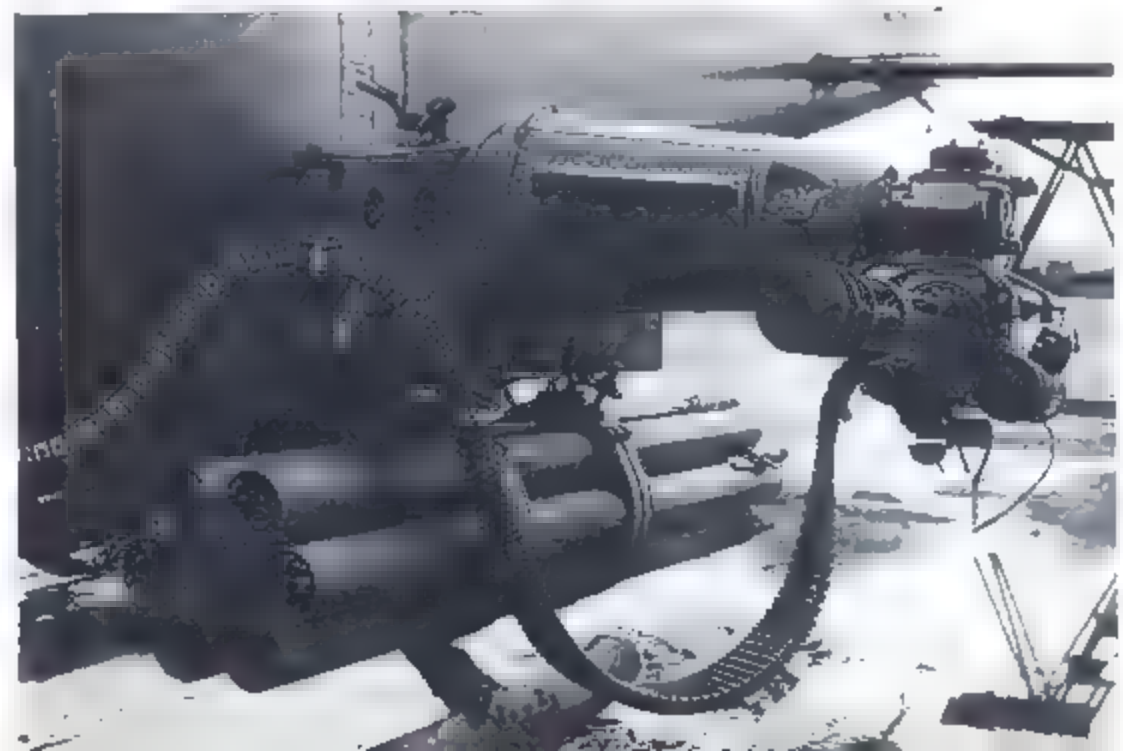
Though tested on the UH-1B, this system saw limited production for use on the AH-1G Cobra gunship. It consisted of a pair of side mounted 7.62 miniguns enclosed in pods and had a 4,400 spm rate of fire.

(Below) The XM-18 pod-enclosed minigun was tested on the UH-1B but was only used operationally on the AH-1G Cobra. (US Army)

XM-21 (Twin Mini-gun System)

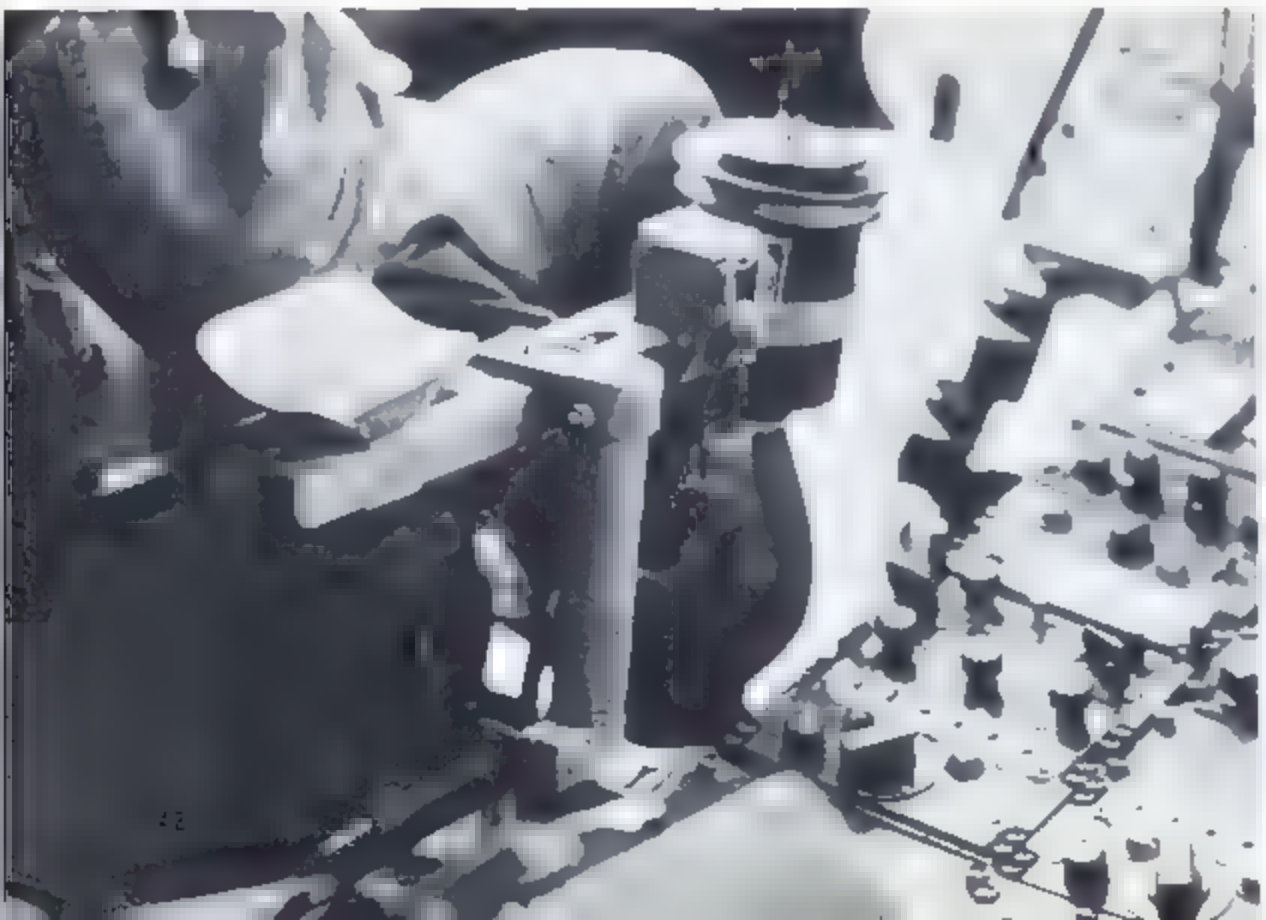
An XM-16 with the four M60C machine guns being replaced by two M-134 miniguns. It was tested in 1965 and sent to Vietnam the following year. The usual configuration incorporated seven shot 2.75 inch rocket pods. The six-barrel miniguns were belt fed through flex chutes from six ammo boxes fastened to the cabin floor, holding a total of 6,000 rounds. The gun's rate of fire could be adjusted to 2,000 or 4,000 spm at a range of 1,500 meters. Many gunship units in Vietnam fired the XM-21 in the fixed mode since problems plagued the weapon in traverse and elevation. This became the most common Huey gunship configuration on Army (and Navy) Hueys after 1966.

(Below) The XM-21 twin mini-gun system, became the standard armament of Huey gunships after 1966, incorporated an M134 mini-gun and an XM-158 2.75 inch rocket cluster on a universal mount. (US Army)



(Above) Pilot's eye view of rockets and mini-gun ordnance enroute to a VC stronghold in Vietnam during 1970. (Joe Long)

(Below) Co-pilot's side stick controller and armrest for flying an SS-11 missile to its target. (Bob Steinbrunn)



XM-22 (Guided Missile System)

The Army's M-22 missile system had its beginning with France's successful use of SS-10 and SS-11 missiles carried on helicopters in Algeria. In March of 1958, three Army aviators were sent to France to train with the anti-tank missile. The first service tests of the SS-11 mounted on an HU-1A Huey were begun on 1 March 1960. Built by Nord Aviation, the SS-11 missile was selected over the SS-10, because, even though it was heavier, it was designed for aerial use, and had a greater range and payload. Bell installed the XM-22, which initially used a sight borrowed from an Air Force P-61 Black Widow fighter, which was later replaced by an improved XM-58 anti-oscillation sight. The system consisted of six AGM-22B wire-guided missiles which had a range of 3,000 meters. It was mounted only on UH-1B and UH-1C Hueys and first saw combat in Vietnam in October of 1965.

(Below) XM-22 anti-tank wire guided missile system mounted three missiles on each side. (Bob Steinbrunn)

XM-23 (Door Mounted M60s)

The basic XM-23 arrangement consisted of a pair of M60D machine guns attached to pintle posts at the aft hard points at the rear of each door opening, and became the standard armament on Slicks. A rapid reloading capability was provided by a 550 round ammunition box attached to the gun by a flexible chute. This was often replaced by a much larger ammunition can used for minigun ammunition. A canvas brass bag was attached to the right side of the receiver to catch spent links and cartridges which could otherwise damage the tail rotor. The M60D was a modified M60C having an aircraft ring and post sight and a spade grip with triggers at the butt. In a field modification a C-ration can was clipped to the right door gun's feed mechanism to assist ammunition feeding which was otherwise hampered by buffeting winds. During the early 1960s, many UH-1Bs in Vietnam had door M60s mounted to Sagami mounts which could be swiveled out and away from the doorway to facilitate loading. Among the countless variants of the XM-23 were systems incorporating twin M60s mounted side by side (often called 'Smokers'), or over and under mounted M60s (called 'Piggyback 60s'). Often these door mounted M60s were field modified to make them lighter in case they were needed on the ground following a shoot-down — the sights and bipod were usually removed. Hand held 'free 60s' were often hung from the ceiling on a 'bungee' cord. The M60 could fire 550 apm at a range of 1,100 meters.

(Below Left) These 'piggyback' M60 machine guns, provided the firepower necessary for a 'chase' ship to rescue downed aircrews in Vietnam. (Author)

(Below Right) This makeshift arrangement of twin M60s was installed in a UH-1D at Tan Son Nhut in 1967. (US Army)

XM-26 (TOW Missile System)

Tube launched, Optically tracked, Wire guided (TOW) missile is a fifty pound anti-tank missile designed for ground firing but used successfully on UH-1B Hueys. Five systems, built in 1967 as prototypes, comprised large pod units of three missiles mounted on each side of the aircraft. The port nose section was modified to accommodate a telescopic sight operated by the copilot/gunner. TOW equipped UH-1Bs were hastily deployed to Vietnam on 22 April 1972 where they destroyed twenty-six North Vietnamese tanks during the Spring invasion. Although the TOW combat team completed their task in two months, the XM-26 system remained in Vietnam until January of 1973. This marked the first time the Army had fielded a highly effective aerial anti-tank weapon. Concurrent with orders to deploy the aerial TOW system to Vietnam, the ground based TOW system was deployed to South Vietnamese crews for training — virtually all TOW equipment furnished to South Vietnam was captured or destroyed.

(Below) One of the XM-26 TOW equipped UH-1Bs sent to Vietnam in April of 1972 to thwart North Vietnamese armor. (US Army Military History Institute)

XM-30 (Side Mounted 20MM Cannons)

Two side mounted XM-140 20MM cannon comprised this system which was designed at Springfield Armory to replace the XM-3. Never used operationally, the guns of the XM-30 could fire 425 spm at a range of 3,000 meters. Linked ammunition was stored in cans on the cabin floor and fed through belts which were routed through slots in the fuselage.

XM-31 (20MM Cannon Pod)

This system used two side mounted 20MM M-24 gun pods capable of firing 700 spm at a range of 3,000 meters. The linked belt fed ammunition was routed through a slot located above the cargo door opening since the guns were top loading. This system was used on UH-1B and C Hueys in Vietnam on a limited basis.

(Below) The XM-31 20MM cannon pods mounted on a UH-1B in Vietnam in 1966. (US Army)

XM-39 (20MM Automatic Cannon)

Produced during the 1950s by the Ford Motor Company and the Pontiac Corporation, this system used 20MM single barrel automatic cannons mounted on platforms in both cargo door openings of UH-1Bs. This ungainly system filled the cargo area and could fire 1,500 spm.

XM-59 (AN-M2 .50 Caliber Machine Gun)

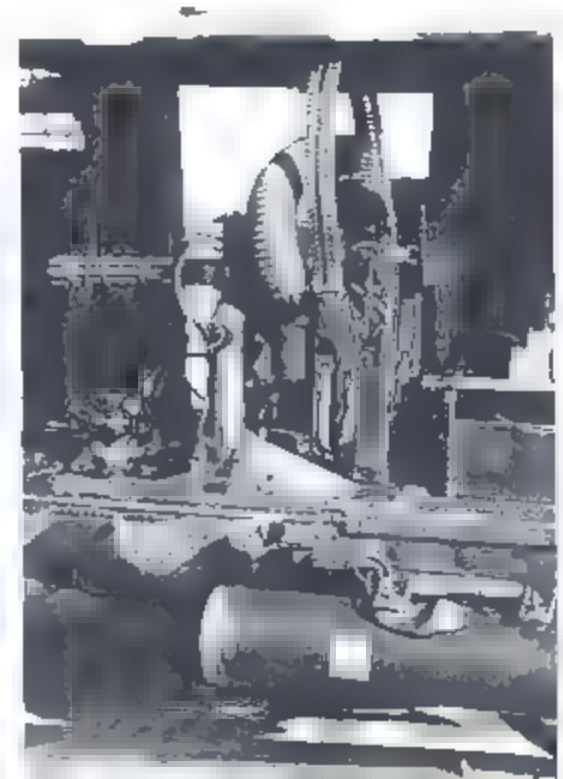
A door gun system used on Huey slicks, the XM-59 is essentially the XM-23 adapted for use with the .50 caliber machine gun which attaches to the XM-23 base tube assembly. Features of the kit include an ammunition box, link receptacle, and brass deflector. The XM-59 designation uses an M60D on the opposite side. The .50 caliber can fire 700 spm at a range of 3,000 meters.

XM-93 (Hand Operated 7.62 Mini-Guns)

Air Force Hueys reached their maximum armed potential with the application of the XM-93 and subsequent XM-93E1 systems which featured 7.62 hand operated mini-guns mounted in each doorway. These weapons could also be fixed in a forward attitude and fired remotely by the pilot. XM-134 (GAU-2B/A) mini-guns had an adjustable rate of fire of 2,000 or 4,000 spm at a range of 1,500 meters. The XM-93 ammunition capacity was 10,500 rounds — the XM-93E1 held 12,000 rounds. A similar system used on Army 'Nighthawk' Hueys in Vietnam had the XM-134 mated to a mount made in-country. Late in the war, ACTIV modified this unit with an XM-28 ammunition drum to bring the system capacity up from 1,500 rounds to 8,000 rounds. Both systems were belt fed from ammunition cans stored in the center cargo area. The Air Force type of mount, which could be rotated inside the cabin for storage, featured a brass catcher with flex tubes extending below the cabin deck.

(Below Left) Hueys displayed exemplary firepower when outfitted with the XM-93 hand operated mini-gun. This weapon, mated with an LAU-59/A rocket pod, became the standard on VNAF UH-1Hs during the 1970s. This VNAF gunner fires an XM-93 mini-gun under the direction of his USAF advisor. (US Air Force)

(Below Right) This UH-1N of the 20th SOS, in early 1982, was armed with the XM-93 and LAU-61/A rocket pod which was 10 inches longer than the LAU-59. The mini-gun, tipped with flash suppressors, is rotated into the cabin which permits closing the doors. The large flex duct is inserted into the cylinder next to the rocket pod for shell ejection below the aircraft. (Mike Campbell)



XM-94 (Twin XM-129 Grenade Launcher)

This system is similar to the XM-93 but uses two XM-129 40MM grenade launchers capable of firing 400 spm at a range of 1,500 meters. It is used on Air Force Hueys, often intermixed with the XM-93. An early variation of the same principle, designated the Honeywell MK 18 grenade launcher, was briefly tested on Navy Hueys of HAL-3 in Vietnam.

XM-157/XM-158 (LAU-59/A Rocket Pod)

These designations were given to the seven shot rocket pods usually used in conjunction with the XM-16 and XM-21 systems. The 2.75 inch Folding Fin Aerial Rockets (FFAR) weighed either ten or seventeen pounds with warheads of either high explosive (HE), flechettes, or white phosphorus (WP). The pods were suspended from the MA4A bomb racks. Although the various types appear identical, differences do exist. Containing seven permanent tubes in its pod, the XM-157 was phased out in 1966 in favor of the XM-158 which had exposed replaceable tubes. At the aft end of each tube is a 1.5 volt swing-away igniter. Rockets could be fired in any combination by either pilot using an MK 8 sight.

XM-159/XM-200 (Rocket Pods)

The XM-159 and XM-200 were nineteen shot rocket pods, with the XM-200 being longer than the XM-158. Due to their size, a spacer was used between the bomb rack and the XM-156 mount. These rocket pods were used with either the XM-5 system or as a single unit. Hueys armed with these pods were commonly called 'Hogs'.

(Above) XM-157 rocket pod mounted to a UH-1E of VMO-2 in Vietnam. In the doorway is an improved M60 mount. (Bob Chenoweth)

(Below) XM-200 rocket pod attached to an XM-156 universal mount. A spacer had to be added between the mount and bomb rack due to the size of the pod. (Author)

TAT 101 (M60 Machine gun Turret)

The Tactical Armament Turret 101 (TAT 101) was developed for Marine Corps UH-1E Hueys by Emerson Electric. The system uses a hydraulically driven chin turret housing two M60 machine guns and its own 1,000 round ammunition supply. The first two examples were fitted to a pair of UH-1Es belonging to VMO-6 in early 1966.

(Above) TAT 101 chin turrets were used on a number of UH-1Es. (Bob Chenoweth)

Miscellaneous Systems

A myriad of systems (other than armament) were used on Hueys, many of them the product of necessity developed during the Vietnam conflict. Some were available as standard equipment while others were designed and fabricated at field unit levels. Among them were fuel tanks, with one being an arrangement of two 150 gallon fuel cells carried in the passenger compartment — another used a pair of aluminum 60 gallon tear drop shaped fuel tanks mounted to pylons on the aft hard points. Other equipment included various types of flare containers, illumination devices, Tyler camera mounts, downed aircraft recovery gear, spray units, fire fighting gear, insertion/extraction equipment, and parachute rigs.

During 1963 the Army Concept Team in Vietnam (ACTIV) initiated a project to evaluate the Helibome Command Post (HCP) better known as a *Command and Control Huey*, or a *C and C Huey*. After a number of improvised C and C Hueys were used with limited success by field units, the Army Electronics Research and Development Laboratory developed four systems which were sent to Vietnam in December of 1963. The first Hueys equipped with the HCP multi-radio console were UH-1Bs. Since the HU-1Bs on-station time was limited, an additional 50 gallon fuel tank was installed under the bench seat along the aft transmission wall — permitting a two hour loiter time. Due to the system weight, UH-1B C and C aircraft lacked armored seats since it was flown at greater heights than other Hueys. An average C and C mission had four officers monitoring the console radios located in the cargo cabin. One version of the C and C system was so large that its single-sideband radio had to be installed in the tail boom. C and C Hueys were easily identified by the number of antennas, the type and location of which depended on the mix of radios carried.

A commonly used system was the internal rescue hoist which consisted of a vertical post fastened to the floor and cabin ceiling, a boom, and an electrically operated winch. The hoist, with a 600 pound capacity on its 256 foot cable, could be positioned in one of four locations in the cabin. Air Force Hueys and some Army models use a jungle penetrater hook on their hoists.

April of 1972 saw, the introduction of the communist SA-7 Strella anti-aircraft missile in Quang Tri Province. By mid June, allied aircrews reported 145 launchers in use. Anticipating this threat, the Army had purchased over 1,000 IR suppressor kits for its UH-1 Hueys and AH-1G Cobras from 1967 to 1971. They consisted of air flow panels installed over aft engine cowling screens forward of the tail pipe which, was redesigned to direct exhaust into the rotor-wash, reducing the engine heat signature that the Strella 'locked-on' to. These IR suppressor kits became a standard installation on Army and other combat Hueys. However, helicopter crews quickly learned that their best defense against the SA-7 was to fly below 50 feet.

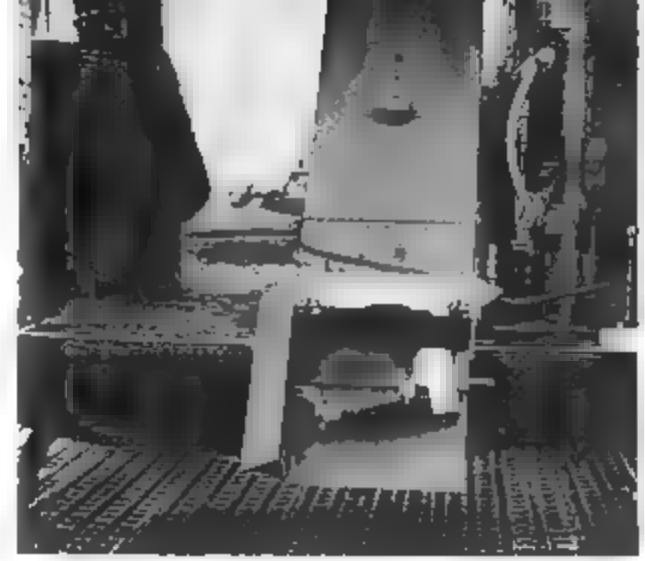
One highly successful system made use of SGF-2 'fog oil' injected into the exhaust ■ produce billowing smoke which was used as a protective screen in tactical situations. A Huey equipped with this system could lay a wall of smoke that provided protection from enemy gunners long enough to land assault troops or evacuate wounded. This system, the XM-52, often called 'Pollution' or 'Smoker', was developed for use in Vietnam sometime in 1966. The Smoker was usually a slick which flew 'on the deck' at an airspeed of fifty to eighty knots for smoke laying ■ be effective. Its slow speed and low flight put the Smoker in ■ highly vulnerable position prompting units to mount .50 caliber machine guns or miniguns in the doorways. System components included a fifty gallon self-sealing oil tank located in front of the transmission wall in the cabin. The oil was pumped through flex hoses from each side of the tank to and out of a ring with twenty-four jets emplaced around the circumference ■ the exhaust — the oil immediately vaporized into a thick smoke that billowed rearward and down with help from the rotor. A similar configuration ■ the UH-1C used two fifty-five gallon oil bladders on the cabin floor that produced approximately eight minutes of smoke.

In 1965 an Acoustic Bullet Detector was attached to the belly of a UH-1B for tests. Developed by the Limited War Laboratory (LWL), the detector was designed to warn crews that they were receiving small arms fire.

Another ingenious device developed by the LWL was an Airborne Personnel Detector better known as a 'people sniffer'. ACTIV was responsible for testing the system in the Huey. The 'sniffer' was first tested operationally by the 1st Cavalry Division and the 4th Infantry Division as an infantry asset and turned over to the USAF 20th SOS in 1967 to be tested on Hueys. Eight units were later evaluated for Huey use by the 1st Cav and 4th Infantry Division. The 'sniffer', which required an operator to monitor air samples drawn in through an air scoop on the nose, was sometimes confused by conditions other than those where human chemical scents were prevalent.

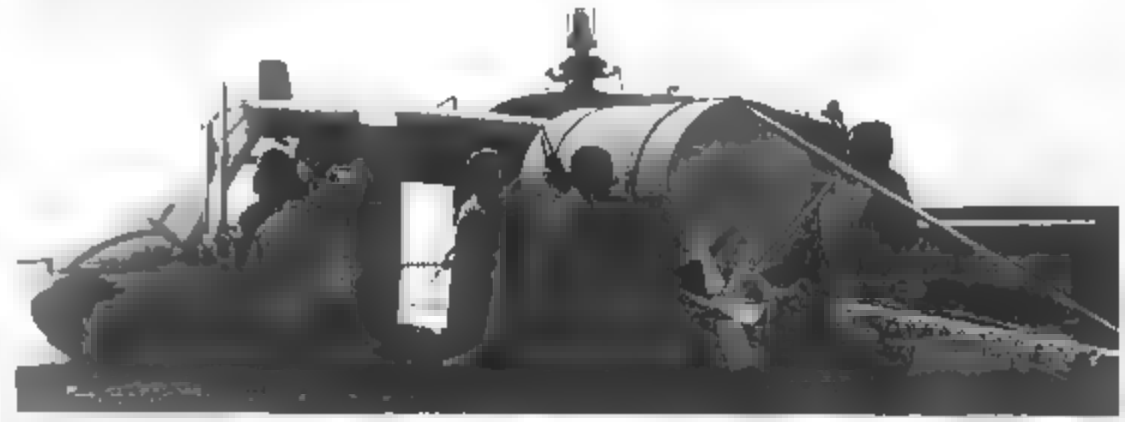
(Above) The engine heat baffle and 'toilet bowl' exhaust comprised the IR suppressor kit. (Koening via Pete Harlem)

(Below) The fifty gallon self-sealing oil tank of the XM-52 smoke system. The bench seat was replaced by a plywood panel. (Bell)



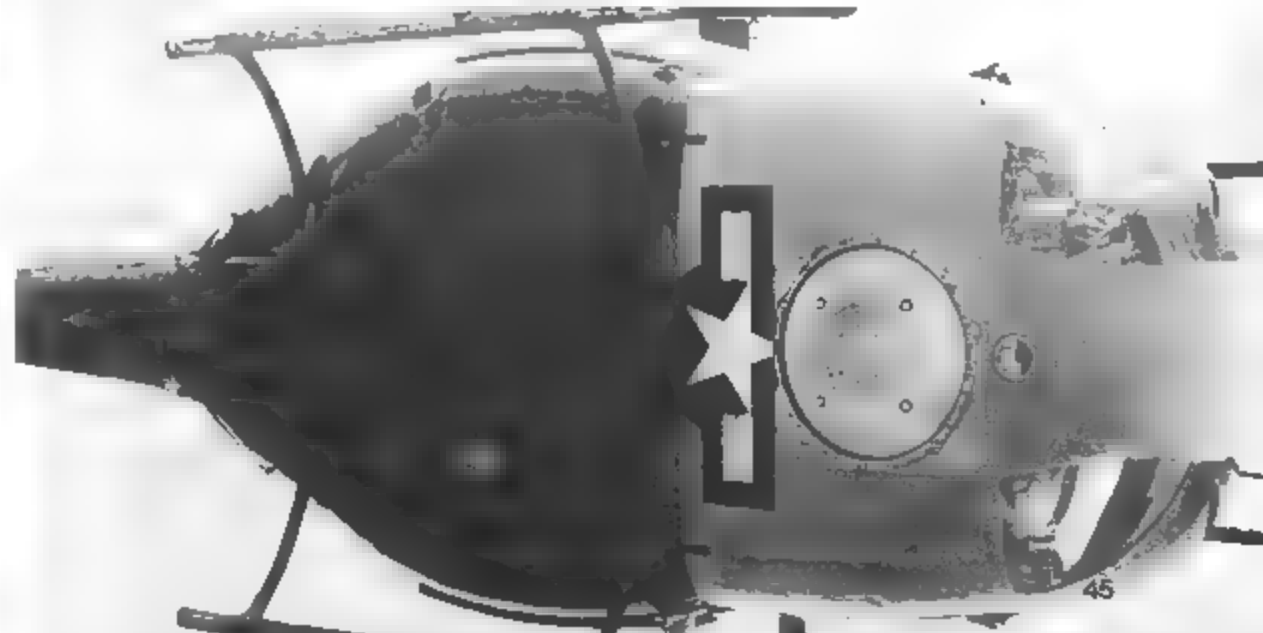
(Above) A member of the 173rd Aviation Platoon, 173rd Airborne Brigade, at Bien Hoa with a locally fabricated 81mm Mortar Air Delivery (MAD) system in April of 1966. (US Army)

(Above) A UH-1H of the 101st Airborne Division sowing mines from bomb dispensers during 'Reforger 76' ■ Germany. (US Army)



(Above) Members of the 242nd Chemical Platoon, 1st Infantry Division unload a 3090 tear gas and defoliant sprayer from a UH-1D in 1968. (US Army)

(Below) An experimental 'acoustic bullet detector' installed on the belly of a UH-1B at Aberdeen Proving Ground in the early 1960s. (US Army)



Huey Night Fighters

The night belongs to Charlie — referred to the Vietcong's practice of using the cover of darkness to wage a major part of its guerrilla war. The Army initially countered this with a number of field developed light systems, and later with of a number of sophisticated systems developed for Huey helicopters to deny the enemy the use of darkness.

An early attempt at providing night illumination from Hueys in Vietnam was a device designed and built by CWO-3 Kenneth LaMonte in 1964. This jury-rigged, though very capable system, consisted of a four foot piece of pipe mounted to the universal gun mounts on each side — six bomb shackles secured to the bottom of each pipe allowed twelve flares to be carried. The pilot could drop the flares in any sequence when the wiring was tapped into the XM-6 firing system.

The first airborne weapons system used successfully to locate and attack the enemy at night was developed during early 1965 by the 97th Aviation Company called 'Lightning Bug' and later 'Firefly'. This system consisted of a cluster of seven high-intensity C-123 landing lights mounted on the floor in the right door of a UH-1B. Another version was pole mounted in the left door which lessened the glare on the pilot. Page Aircraft Maintenance Inc was contracted to build a Lightning Bug for training aviators at Ft Rucker resulting in a further improved version. Hueys equipped with the Firefly were heavily armed and usually worked with a mix of other armed aircraft.

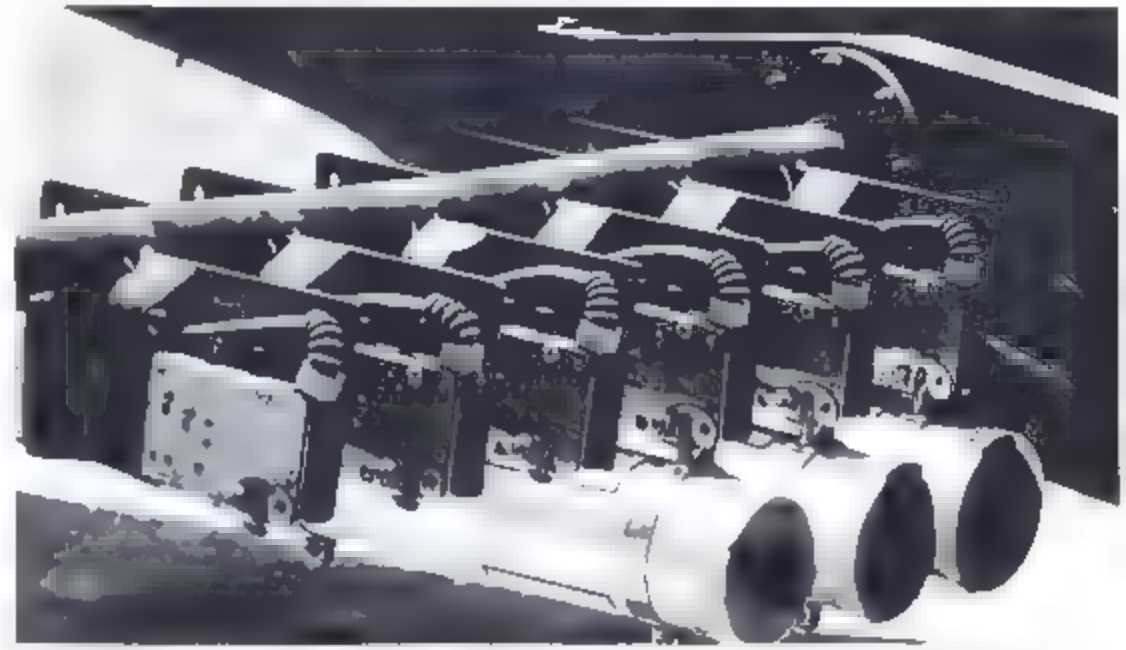
Iroquois Night Fighter and Night Tracker (INFANT) was developed by Hughes Aircraft under the direction of the Army Night Vision Laboratory in 1967. After extensive testing in the US, the first three models of the AN/ASQ-132 were further evaluated in Vietnam and assigned to the 1st Cavalry in November of 1969. Three months later, one of the AN/ASQ-132 equipped Hueys was destroyed while making a rocket run on an enemy position. Eventually, four INFANT platoons were deployed to Vietnam. UH-1C model Hueys were fitted with L-13 engines (upgrading them to UH-1M standards) to support the INFANT system which provided the crews with night vision to fly and attack targets in almost total darkness. This was accomplished with two remote night vision sensors ('seekers') mounted on the nose in a turret assembly. The right sensor formed and intensified images electronically and displayed them on a monitor, while the left periscope housed a low-light level TV (LLLTV) which displayed images on two eight inch screens mounted on the instrument panel, and a fourteen inch screen mounted on the rear cabin which was monitored by the crew chief or gunner.

LLLTV was secretly tested by the Navy Research and Development Unit in Vietnam during 1968. At the cabin sides, perched atop the gun mounts, were two 500W Xenon infrared searchlights to aid in pin-pointing a target. Once a target was established, the XM-21 armament system did the rest. Significant modifications were made to the wiring, instrumentation, and control panels of the UH-1M, as well as strengthening the nose mounted XM-5 grenade launcher hard points, in order to accept the LLLTV periscope assembly. To avoid compromising the crew's night vision and to avert detection, the miniguns were tipped with flash suppressors and fired 'dim tracer' ammunition which was specifically developed for INFANT, modified chemically to produce low-intensity light invisible to the naked eye. INFANT Hueys were outfitted with a non-standard Navy formation light kit consisting of four electroluminescent light panels (three on the cabin roof and one on the tail rotor hub), and incandescent lights on the outboard rotor tips. The Navy had developed the light kit for the 540 rotor system in 1967. Installation of the INFANT package, however, brought the UH-1M up to its maximum gross weight, making the aircraft nose-heavy and precluding the kind of maneuverability vital to gunship tactics. The INFANT system was used with various combinations of available aircraft which included 'Night Hawk' UH-1s, gunships, and 'Night Phantom' Mohawks.

Another limited system which was mounted in the UH-1M was the AN/AAQ-5 Forward Looking Infrared Fire Control (FLIR). The FLIR featured a 260 pound turret sensor turret mounted to the nose hard points. Used for both day and night missions, FLIR produced a TV picture (based on thermal radiation characteristic comparisons of target and background) and displayed it to the pilots and crew on TV monitors. Like INFANT, FLIR was integrated with the XM-21 gun system and incorporated most of the INFANT modifications.

A similar system, the Remote Image Intensifier System, was installed on five UH-1Cs and tested from June to 5 November of 1966. This nose mounted camera unit electronically enhanced moonlight and displayed the image on video monitors in both the cargo area and on the left instrument panel. Tests were unsuccessful and these Hueys, called 'Batships', were later returned to their original state.

Huey slicks used for night operations were dubbed Night Hawks and were fitted with a variety of weapons systems, and illumination devices, which were often the result of GI ingenuity. The more common systems made use of .50 caliber door guns, hand operated miniguns, twin M60 machine guns, flare dispensers, and searchlights. Early renditions of Night Hawks were called Night Hunters and Flashlights. The system became standardized in Vietnam in 1969 when the 25th Infantry Division designed and built a package consisting of an M134 minigun (stepped down to 1,500 rounds per minute rate of fire), a 'Starlight' IR scope, and a Xenon searchlight which was designed for use on the Sheridan Armored Reconnaissance Vehicle. A crew normally consisted of pilots, light operator, and three or four gunners for the mini-gun, twin M60 on the right side, and the 'free M60'.

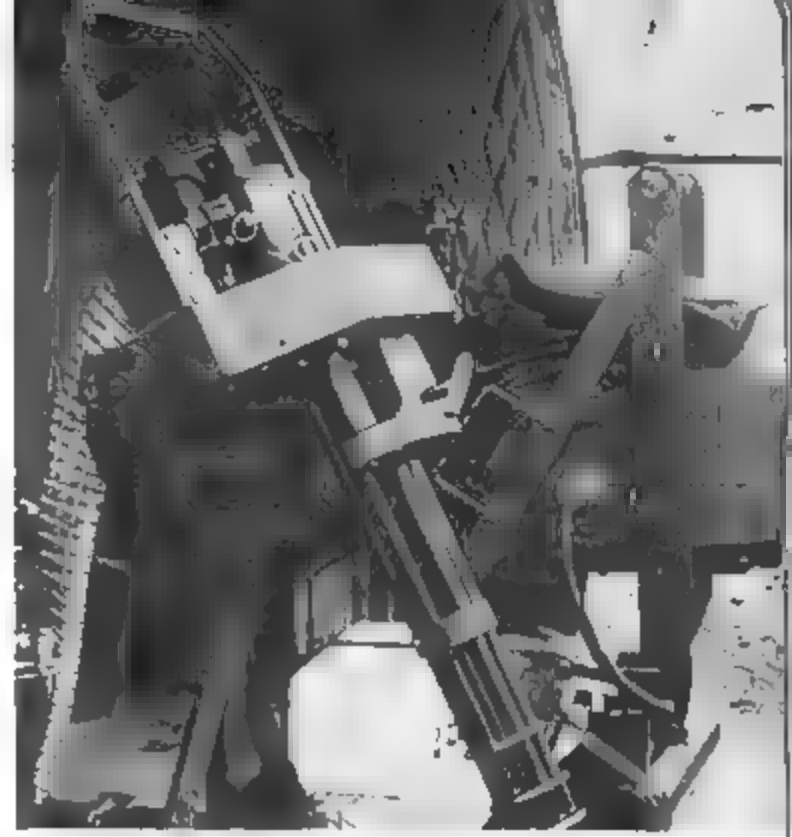


(Above) Designed and built by a Huey pilot in 1964, this device could handle up to twelve flares for night operations. (Cary Shelton)

(Below) UH-1M Huey testing the Iroquois Night Fighter and Tracker (INFANT) system at Fort Rucker during 1969 prior to being deployed to Vietnam. (Defense Department)

(Above) The Bell 'Night Sun' 20,000 watt xenon searchlight, fitted on a UH-1H, weighed nearly 300 pounds and could bathe a 900 foot circle on the ground ■ ilight from 3,000 feet. (Bell)

(Above) A 'FLIR' equipped UH-1M armed with flash suppressor-tipped M-134 mini-guns. (US Army)



(Above) An M-134 mini-gun was built into this Army-built mount for use on slicks in Vietnam. Next to it is mounted a searchlight for night operations. (via Pete Harlem)

(Below) UH-1D Nighthawk Huey at Tan Son Nhut ■ January of 1967 with a 'Lightning Bug' seachlight backed up by a .50 caliber M-2 system (US Army)

(Below) 'Killer Hawk', a Night Hawk Huey of the 187th AHC in 1970, carries a xenon light, a 'starlite' scope, and a minigun which usually had a 'stepped-down' rate of fire of 1,500 rpm. (Mike Stratton)

THE CIVILIAN HUEY

Considering the military track record of the Huey, it's not surprising that the aircraft adapted well to civilian life. Commercial Hueys provided private industry with a machine of proven capability to carry out heavy lifting and high volume passenger transport. So popular were military surplus and early production 204B and 205 Hueys purchased by civilian agencies, that soon new models were being developed specifically for the civilian market — a whole new chapter in the Huey lineage began. Dominating the market was the offshore oil industry with Petroleum Helicopters Inc (PHI) being the leader in Huey use. With more than 450 helicopters, PHI boasted of the largest helicopter fleet in the world outside of the US and Soviet military. PHI pioneered every phase of commercial helicopter transportation while serving mainly the gas and oil industry. Ninety-eight percent of PHI's work was offshore, staged from fifteen bases along the Gulf coast. The firm's first Huey inventory consisted of Model 205s with these being replaced with Model 212s and 214STs.

Over a three year period, beginning in 1973, Exxon began purchasing Bell 205s, eventually owning ten examples. In 1982 these were replaced by Bell 212s. Another offshore concern with a Huey inventory was ERA Helicopters Inc. This Alaska-based firm operated Hueys from a number of coastal heliports. Since Hueys belonging to these companies spent the majority of their time over water modifications were made to include the addition of permanent or stowed flotation gear, improved navigation equipment, and altered emergency exists. From the Vietnam era to the present, large numbers of Hueys have found their way onto the inventories of fire and police departments and commercial air carriers. Besides the petroleum industry, large corporations use Hueys for mining, heavy construction, and forestry — often in remote areas.

Bell Model 214A

In December of 1972 Bell received an order from the US Army for 287 Model 214As earmarked for delivery to Iran through the US government. This model, developed from the short-lived experimental 'Huey Plus', was powered by a 2,930 shp Lycoming LTC4B-8D turbine engine, an improved version of the T55-L-7C, which was installed in the original 214A demonstrator shipped to Iran. The transmission and rotor drive system were the same as that developed for the King Cobra experimental gunship. The first model flew on 13 March 1974 and deliveries began in April of 1975. Just three days after delivery, the first Iranian production model set five world records for altitude and time to climb. This Huey boasted an 8,000 pound capacity cargo hook (twice that of other Hueys) and was the most powerful military Huey. It is easily identified by its oversized engine area. At a maximum take-off weight of 13,800 pounds, the 214A can cruise at 161 mph for a range of 283 miles while carrying sixteen passengers. To date, no military service, other than Iran, has ordered the powerful 214 series. Though conceived as a military variant, this model became the basis for numerous commercial Hueys.

Bell Model 214B

On 4 January 1974, Bell announced the forthcoming availability of a commercial version of the Model 214A, called the Model 214B 'Big Lifter'. Making its debut in September of 1974, the 214B was powered by a 2,930 shp T5508D engine driving the same transmission system as the earlier Model 214A. The fifty foot main rotor was equipped with a Wortmann blade section with a thirty-three inch chord, swept tips, and an advanced rotor hub. Other features included an automatic flight control system and dual hydraulic systems. It differentiated from the military 214A by having an engine fire extinguishing system, push-out escape windows in the cargo doors, and commercial electronics. Performance figures and weight carrying capabilities equalled those of the 214A. 800 gallons of water could be carried in the fire fighting role. A subsequent model, the 214B-1, differed in having the maximum take-off weight limited to 12,500 pounds to meet certification standards.

Bell Model 214C

The Model 214C was similar to the Model 214A but was equipped for search and rescue. Thirty-eight aircraft were destined for Iran under the Military Assistance Program with the first example being delivered to the US Army on 17 December 1976. Thirty-nine were eventually delivered to Iran before business with them ceased.

Bell Model 412

Bell began development of the Model 412 in September of 1978 with the first flight being made on 3 August 1979. This was an advanced technology four-bladed variant of the twin turbine Model 212 and Bell's first four-bladed production helicopter. In 1981, Bell hoped to sell the Model 412, or at least its rotor system, to the military as a replacement for the UH-1N. It was faster, smoother, and quieter than the N variant, had an improved transmission, and an increased payload of 1,100 pounds.

Bell Model 214ST

Called the 'Super Transport' or 'Stretched Twin', this model is the furthest deviation from the basic Huey design, but a Huey nonetheless. This stretched version of the Model 214 began development in September of 1977 with the first flight being made on 21 July 1979. Developed specially for service in Iran and the offshore petroleum market, the 'ST' has not been re-ordered by any military service other than Iran and the Venezualan Air Force which received two examples in 1982. 350 Model 214STs were slated for construction under license by the Iranian Helicopter Industry. On this Huey giant, which featured a staggering 33 inch main rotor chord and a 14 inch tail rotor chord, Bell for first time offered a wheeled undercarriage. The main rotor diameter was 52 feet having Wortmann blades with swept tips. Power was supplied by two General Electric CT-7-2A engines rated at 1,725 shp each. Maximum gross weight was 17,500 pounds with a 435 gallon fuel capacity. The cabin area of the 214ST was lengthened by eight feet over the standard Model 214 allowing a seating capacity of seventeen passengers plus two pilots. Other standard features include a cruising speed of 155 mph and a fully automatic flight control system.

(Below) This Bell 214B, used by Rocky Mountain Helicopters at Mountain Home, ID, has a bubble window in the port door which enables the pilot to watch the sling load during logging operations. (Duane Heda)

(Above Left) Belonging to Petroleum Helicopters Inc (PHI), this Bell 412 has float gear attached to the skids and weather radar mounted in the nose. The four bladed rotor has Red and White bands on its top surfaces. (Boyd Waechter)

(Above Right) Bell 205A-1 in Red and White lower surfaces, and Black upper surfaces in 1983. This Exxon owned float Huey had its tail rotor on the right side. (Boyd Waechter)

(Below Left) Though still a Huey, the 214ST bears little resemblance to the original design. This version can carry seventeen passengers plus the pilots. PHI operates a number of these for offshore oil work. (PHI)

(Below Right) This PHI owned Bell 212 Twin in the PHI livery of Yellow and Black, carries inflatable floats on the lower sides of the fuselage and weather radar in the nose. (Boyd Waechter)

New

SS6002 . . . And Kill MIGs (Revised Edition) $5.95
From the shooting down of MiGs over North Vietnam to the downing of Su 22s by F-14s. 131 B&W and 10 color photographs. 25 full color paintings. 80 pages. (Soft Cover)

SS6042 Wild Weasel $8.95
The SAM Missile suppression story. F-100 to F-4 with emphasis on the F-105. Over 125 photos, numerous line drawings. 64 pages and 10 pages of color including covers. (Soft Cover)

SS6010 Phantom II - Pictorial History $7.95
Over 140 photos, line drawings and eight pages of color drawings. 41 color profiles and two color photos. The most complete volume on the backbone of the Free World's defense. (Soft Cover)

VIETNAM . . . AS IT REALLY WAS

SS6032 Gunships, A Pictorial History of Spooky.....$8.95
From the AC/FC-47 to the Lockheed AC-130 Spectre, all variants of the Gunships used in Vietnam are covered. 163 photos, 15 drawings, 2 maps, color photos, and 15 full color paintings. 64 pages. (Soft Cover)

SS6033 Armor in Vietnam $8.95
From the French effort during the first Indochina War to the end of American involvement, a multitude of vehicles are covered. Any vehicle which was used to improve the mobility of personnel, weapons, and provide support is included with an emphasis on the true armored fighting vehicles (AFVs) used in the conflict. 194 photos, 4 maps, and 37 full-color paintings. 80 pages. (Soft Cover)

SS6041 Riverine: The Brown Water Navy in Vietnam $8.95
The development and history of the US Brown Water Navy fighting along the coast, rivers, and canals of Vietnam. 149 photos, 2 maps, 64 pages with 10 pages of color. (Soft Cover)

SS6040 Airmobile $8.95
Details the history, organization, tactics and weapons of the US Army's helicopter force in Vietnam. 21 color paintings, 19 color and 140 B&W photos and 2 maps, 64 pages. (Soft Cover)

A THREE VOLUME SET ON THE AIR WAR IN VIETNAM

SS6034 Air War Over Southeast Asia Vol. 1 .....$8.95
The people, the tactics, and the technology of the Vietnam War from 1962 through 1966 are emphasized. 212 B&W photos, 9 color photos, and 18 full color paintings. 80 pages. (Soft Cover)

SS6036 Air War Over Southeast Asia Vol. 2.....$8.95
Details the 1967 through 1970 period of the war covering every notable aspect of the war in the skies. 209 B&W and 13 color photos. Includes 11 color paintings, 80 pages. (Soft Cover)

SS6037 Air War Over Southeast Asia Vol. 3.....$8.95
Covers the 1971 through 1975 period, when the American presence in Vietnam ended. 217 B&W photos. Includes 11 color paintings and 14 color photos. 80 pages. (Soft Cover)

UH-1B of UTTCO at Tan Son Nhut Airbase in February of 1963 mounting a pair of factory installed 7.62 machine guns and a 2.75 inch rocket kit.

UH-1H of the US Readiness Command during 1977.

ISBN 0-89747-179-2